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THE AMERICAN FARMER.

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HON. EDWIN WILLITS.

The Assistant Secretary of the United States Department of Agriculture.

BY HOWARD B. CANNON.

RESIDENT WILLITS, of the Michigan Agricultural College, uttered these vigorous words, on his entrance upon his duties as the head of that great institution: "There is health and vigor in knowing how to do something; there is better health and more manly vigor in doing it. A man with a trade has a moral capability—it is a fence around his energies to keep off trespassers. You give a man something for his hands to do, and you have taken hostage for his citizenship. The habit of daily toil is a better conservative of the peace than a paid constable." He spoke from his experience and observation, as can be seen by a few items of biography.

Edwin Willits, the present Assistant Secretary of Agriculture, was born at Otto, Cattaraugus Co., N. Y., April 24, 1830, and at the age of six went with his parents to Michigan. His early years were passed on his father's farm in Washtenaw County. The boy was an omnivorous reader, and the thirst of the youth has never grown old. The toil and pleasure incident to life on a frontier farm were his experience. The schools claimed him, however, for a time, and by 1855 we find he had received his degree at the hand of that grand old man, President Tappan, of the University of Michigan. After completing his university course, he studied law in the office of ex-Senator Christiancy, at Monroe, and was admitted to the bar in 1857. For several years he was engaged successfully in the practice of his profession, and attained a position of prominence among the lawyers of the State. Though thus engaged in public work as attorney or teacher, he purchased a farm of 130 acres, a part of which is now in the city of Monroe, and for 20 years resided upon it, supervising it, and whenever the chance offered resorting to the field to follow the plow or sow the seed.

Monroe, Mich., is yet his legal residence, and mayhap, when the years of his public service are over, he will return there to enjoy his repose in the old homestead.

One who is brought up on the farm, and who carries on a farm for 20 years during the period of his vigorous manhood, may certainly be considered as a farmer, even though other professions have also claimed his attention.

The *Magazine of Western History*, speaking of Mr. Willits's educational career, says:

Mr. Willits's tastes, however, and adaptability as an educator drew him into close relation to educational work, and in the schools of Adrian and Monroe he achieved a high reputation both as a teacher and administrator. From 1860 to 1873 he was a member of the State Board of Education, and was eminently fitted, both by his culture and experience, to take the prominent place accorded to him by his fellow-members. During the first year of his connection with the Board he took exception to the policy of that body in the management of the Agricultural College, and suggested the scheme which soon after resulted in the formation of the State Board of Agriculture and the reorganization of the College. To Mr. Willits, therefore, is chiefly due the beneficent change which brought permanent prosperity to the College. He foresaw and was among the first to advocate the necessity of the change, and it seems like a curious instance of that compensation which time sometimes brings about, that, after the lapse of more than a quarter of a century, he should be placed at the head of the institution whose true policy he did so much to shape in its early days.

For many years Mr. Willits has been a leading member of the Republican party of his State, and has held many positions of prominence and responsibility. He was Prosecuting Attorney for Monroe County from 1860 to 1863, and Postmaster of the city of Monroe from 1863 to 1866. He was also a member of the Constitutional Commission which was selected in 1873 to revise the State Constitution. He was elected to the 45th, 46th, and 47th Congresses from the Second District, comprising the Counties of Monroe, Washtenaw, Lenawee, and Hillsdale, and it speaks well for his popularity at home that he received large majorities over one of the most popular men in the Democratic party and in a district which is now Democratic.

In 1882 he was made Principal of the Michigan State Normal School, at Ypsilanti, which position he filled with gratifying success till he took his seat as President of Michigan Agricultural College.

In 1883 Mr. Willits was invited to deliver the commencement address at the Michigan Agricultural College. He did so, speaking upon "Intelligence as Applied to Agriculture.' This address called the attention of the State Board of Agriculture to him, and upon the following year the Presidency of the College was offered to him. After three months' consideration of the question he accepted, to take effect July 1, 1885

Mr. Willits employed his leisure in studying the agricultural college system, its history and development. A meeting of delegates from agricultural colleges and experiment stations was called by the Commissioner of Agriculture to meet in Washington July 8–9, 1885. Mr. Willits attended as representative of Michigan Agricultural College. The results of his Winter's study came out in an address at that meeting on "Industrial Education." He laid down several propositions relative to the arts:

1. That it is desirable and the time is opportune to establish and foster in the United States schools of technology for instruction in industrial arts.
2. That neither here nor abroad is it practicable to make skilled artisans in the public schools; that the practical skill must be sought for in the shop.
3. That in a country like ours, where four-fifths of the population are in constant use of tools from early childhood up, it is labor lost, and money wasted, and time squandered to impose shop work as part of the regular duties of the public school.
4. That as our cities increase in size, there is a class of children who can, perhaps, be reached in no other or better way than through the shop.
5. That shop work, with few exceptions, will be fascinating only so long as it is play; that it will lose its charm when it becomes a duty.
6. That a jack-at-all-trades is generally good at none.

The fundamental difference between the mechanic arts and agriculture was brought out as follows:

There remains for us in as brief time as possible to apply the foregoing suggestions, so far as they are applicable, to our schools for agriculture. They are properly classed among the industrial schools. There is a radical difference between agriculture and the mechanic arts, which deserves to be noted. We find a much larger element of uncertainty in the one than in the other. A skilled artisan can select his material and apply his principle and construct a machine that shall be practically complete, perfect, and in accordance with his plans and expectations. But no farmer can with certainty predict the outcome of his labors. What with the weather, untimely frost, difference in soils, blight and mildew, uncertain germination, injurious insects, birds and animals, coming unheralded and in unexpected character and numbers, noxious diseases to crop and beast, and the vicissitudes of seedtime and harvest, there would seem to be too much uncertainty in agriculture to call it a science, and too many elements of doubt to be solved anywhere by anyone, much less in a schoolroom by theorists. For this reason the agricultural college ought not justly to be held to as strict an accountability for certainty in scientific results as institutions more distinctively scientific. You can make an absolutely correct mathemetician, a reasonably pure linguist, a fair logician, and a watchmaker who can construct a timepiece that will not vary 30 seconds in as many days; but no agricultural college can turn out a farmer that can raise exactly 31 bushels and 27 pounds of wheat per acre, year after year on the same field, or in the same year on two fields of similar character. Agriculture is in a sense too broad to be a science, or rather is the co-ordinate contribution of so many sciences that the field is too broad for any one man. Nature and Providence have much to do with the processes, and we can only assist the one and submit to the other; we can control neither.

This being so, the natural inquiry is, why then have the agricultural college or the experimental station? The answer is obvious. A special and thorough study of the laws of nature as allied to agriculture will reduce the reducible uncertainties to a minimum and raise the production to a maximum. The college traverses all these points and brings to bear all cognate sciences. There are causes for poor crops that can be prevented, and there are processes to be discovered and taught that can promote productions, whether it be in a hill of white beans or in the fattening of a steer. The range of practical knowledge is so great that it is unwise to leave its acquirement to the uncertain chances of the chance farmer with chance information. The industry is so great that it is entitled to bring to its aid all that science can bestow, experiment can demonstrate, and observation can classify. The farmer should be the first to reap the benefit of any new development of science, instead of being, as now, the last; he is entitled to have at hand the means to apply for himself and test and experiment; and these means are furnished by the agricultural colleges and experimental stations. There has been too little intellect and too much luck in his processes, too little live investigation and too much following in the rut made by others. He has neglected phosphates for his worn-out soil, especially that best of all phosphates, mind phosphate. Aristotle said that the best manure was the farmer's foot; so we may justly say the best fertilizer is the mind of the farmer. The enhanced power to produce comes from an intellect that commands the elements and harnesses the laws of nature. The power to produce is in the earth, and the power to increase that production is in man. The Rhode Island Greening has been made such by the skill, culture, and intellect of man. In all the range of natural resources man has improved upon crude nature and made it bloom and become fruitful where before there were sterility and perfection. This increase and fructification should be credited to mind, and whether it be applied to the soil or to the mine, on the farm or in the shop, it is the element of human creation that can be traced through all the varied forms of industry as the woof of gold in the web of nature. So these great industries have taken the crude materials from the mine and the forest, the sea and the land, and injected into them a wealth of intellect and skill, and have increased their value to so wonderful a degree that they almost challenge the Divine Providence that furnished the material at first hand. These great results are a something as worthy of being measured and weighed and analyzed and separated from the original stock as are the elements of the stock itself. They are crystallized mind, the product of the ages, as positive and real as crystals of anthracite which the ages of geological change have injected into the seams of earth's structure.

His record as President of the oldest Agricultural College was brilliant. He made the creation of a Department of the Mechanic Arts a condition of his coming, and the Legislature, won by his dash, voted liberal appropriations for erecting and equipping the necessary buildings. The attendance at the school soon doubled. The teaching force grew more efficient. The laboratory system was extended. Whether on the rostrum before crowded houses, at farmers' institutes, or from the professor's chair, the eloquence of our President's remarks never failed to charm. The influence of this vigorous administration did not stop at the State line. A committee of the Presidents of Agricultural Colleges was appointed to promote the passage of the so-called Hatch bill. Mr. Willits was one of three gentlemen most prominent in shaping this legislation and promoting its passage. This made possible the splendid system of experiment stations which is now the wonder of the world. The work done here by Mr. Willits, in giving character to this act, is worthy of high mention. As soon as the bill passed the station in Michigan was organized, and he became the first Director of it. Any man who can command the absolute confidence of a college full of young men is entitled to high praise. It takes rare tact to administer its affairs. There must be firmness, tempered by kindness. In the intimate relationship that subsists between a young man and his college president there is a rare chance for giving the bent to the life. How many scores of men have been taught self-reliance and manliness while under the charge of Mr. Willits never can be known.

If one ask for the secret of all this power he must seek it in the methods of the man and his inherent qualities of mind and heart. Nature gives some men large souls and unlimited sympathy. A gentleman once told me: "Willits has marvelous powers of absorption; if we go into a town together he will know more about it by two hours' observation than I could gain by a week's study." This is the instinct of the scientist. Combine this with a remarkable gift of expression, clear, terse, and flowing, and with the analytical faculty which rests not until all the results of wide reading and observation are correlated, and you have the elements which make a good and powerful man.

Mr. Willits's name was considered for Assistant Secretary of Agriculture at the request of certain scientific gentlemen of Washington whom he had known personally whilst in Congress. Commendation came also from those Presidents of agricultural colleges with whom he had been associated in promoting legislation.

These suggestions made an impression on Secretary Rusk, who was also somewhat familiar with Mr. Willits's Congressional career, and he considered that such experience would be very valuable to him. In consequence he suggested Mr. Willits's name to the President for appointment. The first news Mr. Willits had of all this was a telegram saying his name had gone to the Senate, and inviting him to accept. He did so, as he was promised supervision of the scientific work of the Department of Agriculture. He now directs the scientific policy of the Department. The various scientific divisions are in constant counsel with him. To enumerate these divisions will best serve to show the scope of the work: Division of Botany, Microscopy, Pomology, Vegetable Pathology, Forestry, Chemistry—save sugar work—Ornithology and Mammalogy, Office of Experiment Stations; the Rainfall Experiments were placed under his direction, and the extensive and important Irrigation Inquiry and Underflow Investigation were conducted by him. The Library and Museum are under his supervision.

Mr. Willits represents the Department of Agriculture on the Board of Management of the United States Government Exhibit at the Columbian Exposition, and is Chairman of that body by appointment of the President.

With this record it is not surprising that he is found standing second in the great Department of Agriculture.

SPECIAL NOTICE TO THE WOOL-GROWERS OF THE UNITED STATES.

There are many valuable periodical publications in different localities in the United States, but none at our National Capital devoted to the interests of farmers and wool-growers; especially to methods of farming, varieties of production, seeds, varieties of stock, stock-breeding, the care of stock, etc. There is imperative necessity for an ably-conducted journal at Washington, D. C., devoted specially to those interests of farmers and wool-growers growing out of legislation by Congress, the administration of laws by the Executive officers of the Government, the decisions of courts, etc.—a journal that will advocate boldly and fearless protective duties for every product of the farm as amply beneficial as those afforded to the most favored of our protected industries. Importers, wool manufacturers, etc., keep agents in Washington to look after legislation, to appear in the Departments to argue questions arising on the administration of laws; but farmers, including wool-growers, have no agents there located, nor any newspaper there to advocate their interests or protect them. The result has been that adverse interests has always secured advantages over them. The rulings made after the wool tariff act of 1883 by customs officers, in some of the Departments, and even in courts ruinous to wool-growers, never could have been made if there had been an able journal at Washington always promptly advised of questions arising, requiring discussion and prompt notice to the farmers of the country. As early as 1887 a National Wool-Growers' Convention at St. Louis resolved in favor of establishment of such journal at Washington, and on Jan. 12, 1892, the Ohio Wool-Growers' Association renewed the recommendation.

THE AMERICAN FARMER, the oldest agricultural paper in the United States, has recently been purchased, and will soon, and hereafter, be published at Washington, under the editorial management of an able and vigorous writer, a fearless advocate of protective duties for farmers, and a gentleman who will be vigilant to look after legislation in Congress, and all that may be done in the Departments or elsewhere affecting them.

I especially urge upon farmers, including wool-growers, to patronize liberally the journal mentioned. The attempted frauds on the McKinley wool tariff law, the mistakes of customs officers against wool-growers, the personal arguments made by importers in the Treasury Department against them, all know the urgent necessity for a liberal support of this journal. Respectfully,

WILLIAM LAWRENCE, President Ohio Wool-Growers' Association.

SAMPLE COPIES.

Those who receive a copy of this paper are requested to give it a careful examination. The urgent need of a practical farmer's paper at the Capital of the Nation has long been felt. We propose to make of THE AMERICAN FARMER as good if not the best agricultural paper in the whole world. Neither money nor effort will be spared to get the best possible talent to contribute to it, and it will be kept far to the front in everything that relates to the best and highest interests of the farmers of the United States. It will be live, progressive and aggressive from the start, and aim to lead in everything that concerns the farmers in every section of the country.

THE AMERICAN FARMER is the oldest agricultural paper in the United States. For nearly three-quarters of a century it has enjoyed a most enviable reputation as a high-toned, reliable, progressive friend of the farmer. It shall be our aim to maintain this high reputation and increase it. Whatever long-trained skill in journalism, the leading talent in every branch of agriculture or abundant resources can do to make THE AMERICAN FARMER the foremost of agricultural papers shall be done.

At the same time the paper will be furnished so very low as to be within the reach of all. In order to extend its circulation, introduce it to all who are not yet acquainted with it, and give everyone an opportunity to see how well we will keep our promises, we will make an unusual offer. We will furnish the paper from now until the last issue of December, 1892, for the low price of 60 cents—five copies for $2.50.

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THE AMERICAN FARMER, 1729 New York Ave., Washington, D. C.

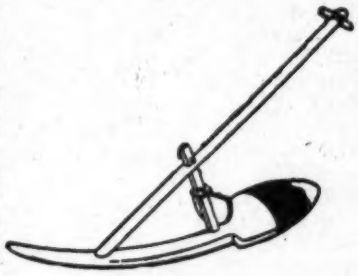
HOW THEY RAISE RICE IN JAPAN.

The Breadstuff of the Far East—The Care and Labor Necessary to Produce a Crop.

[Written for THE AMERICAN FARMER by Frank G. Carpenter.]

RICE is the bread of the Far East, and of all the people in the world one-third grow up, work, and die on little else than a rice diet. The Chinese, the Japanese, and the East Indians know nothing of baker's bread, and wheaten flour is hardly used outside of Christendom. We are ourselves the chief meat-eaters of the world, and we have the idea that a man cannot do good work without meat. The farmer of China and Japan works 12 hours every day on a rice diet, and I have been pulled all day in jinrikshas by bare-legged men who ran at the rate of five miles an hour, and who ate nothing but rice and pickles to keep them going. Some of the strongest men in the world are the Japanese wrestlers, whose fat and muscle are made entirely from rice; and in Siam they take a baby of a few months old and it begins the rice food, which it takes to the day of its death. The Japanese look upon rice as we do upon wheat. Our expression "as good as wheat" is with them "as good as rice," and for a long time all the taxes of the country were paid in rice, and rice was practically the money of Japan. Now the Emperor collects his taxes in the same way that we do. He has instituted a banking system much like that of our national banks, but the money received by the Government is largely the result of the taxes on rice, and 80 per cent. of all the revenues of Japan are gotten from the farmers and farm industries.

The Japanese are among the best farmers of the world. They understand how to use manures and fertilizers, and they have brought irrigation down to a science. For more than 2,000 years they have tilled the same soil over and over again, and to-day the land blossoms like the rose, and its fields are greener than those of the Valley of the Nile. The whole country looks like a garden, and Japanese farming is more like market-gardening than bonanza agriculture. The country is divided up into small holdings, and a few acres suffice to support a family. The people do not in many cases live upon their farms. You find little villages of one and two-story cottages thatched with straw along the roads, and from these people go out to the fields, and men, women, and children work together in them. A surprising thing about the farm lands to us is the absence of barns. The Japanese would look upon the big barns of New York, Pennsylvania, and Ohio as so many Buddhist temples, and they would get down on their knees and bump their heads against the ground as they passed them. The crops are generally taken from the fields to the markets, and such grain as is kept is stored about the house. The Japanese do not require barns as we do. They keep but little stock, and in four-fifths of Japan you will not see a cow from one year's end to the other. They have but few horses, and the most of the labor is done by hand. The fields are sometimes plowed with bullocks, but they are more often spaded or dug over with a great mattock, and in the cultivation of rice nearly everything is done by hand.



JAPANESE PLOW.

The work begins about the 1st of April, when the ground is broken up with the hoe or the plow. If the plow is used it is drawn by a bullock, and the plow itself is for all the world like that used in Egypt in the time of the Pharaohs. It is of wood, and is more like a forked stick than a good American plow. It has an iron point for a plowshare, but there is no loam-board, nor any arrangements for turning furrows or for plowing deep or shallow at will. The farmer carries his plow with him on his shoulders to the field, walking behind his bullock, and he does not hope to do anything more than break the surface with it. The chief part of the work is done with the spade or with the mattock. This last has a short handle, and you see all over Japan during the Springtime men and women standing up to their knees in water and digging up the ground with these great hoes.

The first thing in rice-planting is the nursery. This is usually made in the corner of the field and the seed is sown in it. The bed has been first covered with manure, and it is always the richest part of the farm. As soon as the ground has been prepared the seed is scattered over its surface by hand, and the water is then let out from the irrigation canals so that it covers the bed for a depth of a few inches. There is great care in the selection of the seed, and it is sometimes kept under water several days beforehand. Four or five days after the seed has been sown it begins to sprout, and about five weeks later the young rice plants have grown up and ready for transplanting. During the planting scarecrows are put up in the field, and the Japanese scarecrow always has a bow and arrow, which it is supposed frighten the birds away.

In the meantime the farmer has put his rice lands in order. His beds are made at different levels, and he has seen that little earth walls have been thrown up around the divisions of his fields and has arranged his canals so that he can let the water from one place to another as he pleases. He has been manuring the ground throughout the Winter, and he has made it as level as the floor. He has flooded it with water, and it is as soft as mush when he is ready to plant. He now takes his shoots from the nursery, ties them into bunches of a size that you can easily take in your hand, and then wading through the field, scatters them singly right and left over the water where they are needed. He has a number of half-naked men and women to help him plant, and these take the bunches and set them out in rows of from four to six plants in a bunch, and so that there are from 1,500 to 3,000 bunches in an acre. This planting is done about the first of June. The plants begin to grow at once, and within a few weeks the land of Japan, from being rough and brown, has become a most beautiful green. The country has a climate which is extremely favorable to agriculture. It is so moist and warm in the Summer that the rice fields are like so many hot-beds, and after planting the only

A JAPANESE SCARECROW.

thing that is necessary to do is to see that they are kept free from weeds and are well watered. The farmers watch them as carefully as an old maid does her pet flower bed. You may at any time see men trotting along under big hats watching closely every plant, and if one is out of shape, too deep in the water, or not deep enough, they will push them down or pull the mud up to them in such a way that every plant produces its best product.

The labor of planting a rice field is very great. If you will take all the blades or sprouts in a field of oats or grain and put them down in the ground again with a dibble or your hands, you may get some idea of the labor raising rice.

It is the same with the harvesting. It is also done by hand. The rice blossoms in September, and about the end of September or the first of October, and in some parts of Japan still later, the harvest is ripe. The sickle is used and the rice is cut off close to the ground and tied near the roots in small bunches, which are hung over poles to dry. The rice is about as high as our oats when it is still in the field, and it has to be pulled from the straw and husked before it can be used. If you will take a bundle of oats and pull them through a cross-cut saw, fastened to a piece of wood about the hight of a table, so that all the grains of oats are pulled off, you will get a fair idea of how the Japanese get their rice from the straw. It is still in the shell, however, and this husk or shell has to be taken off before it can be used. One of the most common arrangements for getting this off is an immense mortar, in which the rice grains are put and pounded with a wooden pestle until

the hulls and kernels are separated. Then the mixture is put into a winnowing machine, and this is turned by hand to separate the rice from the chaff. Many of the farmers have little rice mills which work by water, but nearly everything is on the smallest scale, and there are no great rice-husking and polishing machines such as you will find in India, Burmah, and the other great rice countries of the world.

A good rice field ought to produce about 40 bushels to the acre, and some of these Japanese fields produce more. The country of Japan produces nearly a hundred and fifty million bushels of rice a year, and their rice is the finest in the world. It may surprise some to know that there are different kinds of rice, but Japan alone has over 200 kinds, and there is as much difference in the quality as there is in the quality of meat and potatoes. The Japanese understand the possibilities of irrigation. These rice beds are on different levels, and during the time I was in Japan the land made me think of a gigantic patch-work or one of nature's crazy-quilts. Each little spot of green rice had flowers planted upon the little walls of earth which surrounded it, and between the patches of rice were gardens of beautiful flowers and many-colored crops of other kinds. The water which washed the roots of the green rice plants sparkled like diamonds under the sun, and the bare-legged farmers under their big hats with their mahogany legs shining out over the green seemed a natural part of the scene.

A great deal of the irrigation of Japan is done by human labor. The water is raised from one level to another in buckets or in jars fastened to great wheels, upon which men stand and step up from one rung of the wheel to the other with much the same motion a dog in a dog-churn. In the western part of Japan a great deal of the water is drawn from wells by means of a long-handled pole hung on a pivot, by which a man pumps the water out of the ground and spreads it over the fields. Labor in Japan is very cheap. You can get a good man in the interior from 10 to 15 cents a day, and he will board himself. Women can be gotten at still lower wages, and the result is that the farming of Japan is far more intensive than ours, and a much greater percentage is gotten from the acre. Some of the fields produce

Threshing Rice.

two and three crops a year, and one crop is scarcely harvested before the next is put in. This, however, is not the case with rice. It seems to exhaust the land, and rice lands are usually allowed to lie fallow in the Winter. During the past 10 years Japan has changed agriculturally as well as politically, and since the revolution it has become a different country. It has a population of about 38,000,000, and it is estimated that only 10 per cent. of the country is given up to farming; but this area will be rapidly increased from now on. There is a big agricultural college near Tokio, and agricultural schools have been established in different parts of the Empire. Experiments are being made in the introduction of stock, and the whole physical as well as the intellectual life of the people is changing. The fact that the Japanese were Buddhists has greatly prejudiced them against the use of meat. In Buddhism, a man's soul after death is liable to go into the body of an animal, and the Japanese have a prejudice against serving up for breakfast slices of their ancestors, and in the killing of a cow or sheep they might be cutting off the life of grandfather or a great-grandmother. Buddhism is, I think, declining. The contact with Western civilization has caused the people to give up many of their old prejudices, and while they have largely become infidels instead of Christians, after leaving the religion of their fathers they are ready to look at things in a practical light, and they will in the future probably be meat-eaters as well as rice-eaters. The great difference that this will make can hardly be estimated. It will result in giving a vast amount of valuable manure to the soil. The chief fertilizer now known is that of the watercloset, and this, with fish and decayed vegetable matter, are all that Japan has had to make the wonderful crops which she now produces. With cattle and sheep to bring up her soil, the Government lands will be brought under cultivation, and the country will continue to grow in wealth and civilization. It is to-day the most civilized country of the Far East. Its people are the Yankees of the Orient, and though they are learning something from us, they have many things of which we know nothing, and some of their theories of the raising of flowers, fruit, and grains would be invaluable to the United States.

Hulling Rice.

PARROTS.

Why They Have Such Powerful Bills.

Parrots are vegetarians, with a single degraded exception, to which I shall recur hereafter. Sir Henry Thompson himself couldn't find fault with their regimen. They live chiefly upon a light but nutritious diet of fruit and seeds, or upon the abundant nectar of rich tropical flowers. And it is mainly for the sake of getting at their chosen food that they have developt the large and powerful bills which characterize the family. You may have, perhaps, noted that most tropical fruit-eaters, like the hornbills and the toucans, are remarkable for the size and strength of their beaks. If you haven't, I dare say you will generously take my word for it.

And, *per contra*, it may also have struck you that most tropical fruits have thick or hard or nauseous rinds, which need to be torn off before the monkeys or birds for whose use they are intended can get at them and eat them. Our little northern strawberries, and raspberries, and currants, and whortleberries, developt with a single eye to the petty robins and finches of temperate climes, can be popped into the mouth whole and eaten as they stand. They are meant for small birds to devour, and to disperse the tiny, undigested, nut-like seeds in return for the bribe of the soft pulp that surrounds them. But it is quite otherwise with oranges, shaddocks, bananas, plantains, mangoes and pineapples; those great tropical fruits can only be eaten properly with a knife and fork after stripping off the hard and often acrid rind that guards and preserves them. They lay themselves out for dispersion by monkeys, toucans, and other relatively large and powerful fruit-eaters; and the rind is put there as a barrier against small thieves who would rob the sweet pulp, but be absolutely incapable of carrying away and dispersing the large and richly-stored seeds it covers.

Parrots and toucans, however, have no knives and forks to cut off the rind with, but as monkeys use their fingers so the birds use for the same purpose their sharp and powerful bills. No better nut-crackers and fruit-parers could possibly be found. The parrot, in particular, has developt for the purpose his curved and inflated beak—a wonderful weapon, keen as a tailor's scissors, and moved by powerful muscles on either side of the face which bring together the cutting edges with extraordinary energy. The way the bird holds a fruit gingerly in one claw, while he strips off the rind dexterously with his underhung lower mandible and keeps a sharp lookout meanwhile on either side with those sly and stealthy eyes of his for a possible intruder, suggests to the observing mind the whole living drama of his native forest. One sees in that vivid world the watchful monkey ever ready to swoop down upon the tempting tail-feathers of his hereditary foe; ono sees the canny parrot ever prepared for his rapid attack, and ever eager to make him pay with five joints of his tail for his impertinent interference with an unoffending fellow-citizen of the arboreal community.—*The Cornhill Magazine.*

Where Sparrows Build.

The Illinois Legislature in November last passed a law looking to the extermination of the sparrow. Two cents per head was the bounty for all sparrows killed. The State paid $9,000 for 450,000 heads, and the law by limitation has expired, but not so with the birds, as the absence of the above number is not noticeable from the crowd yet on hand. Many persons were injured by the small pellets of lead used by the hunters in large cities, and since the law expired public and sparrows breathe easier.

PROGRESSIVE AGRICULTURE.

The Most Recent Discoveries, Developments, and Ideas in the Science of Farming.

Indian Corn (Maize) as a Food in Europe.

THE work of the Department of Agriculture in securing a wider use of Indian corn in Europe is meeting with deserved success. Not only are mush and corn bread becoming fashionable, but in addition to this there is a real and growing demand for maize products both for man and beast. The circular of information respecting the use of Indian corn as food, prepared under direction of the Secretary of Agriculture, has been translated into German and distributed throughout all the States of the Empire. As the demand may arise in other countries, the circular will doubtless appear in other languages. As an index of the progress which is making in this direction, it may be mentioned that at the late Glasgow Industrial Exhibition maize was granted the highest award as a cheap, wholesome, and nutritious food. The exhibit secured a very favorable space near the front. Every one entering the building was furnished with a circular setting forth the value of maize, and many visited the Exposition in order to partake of the various foods prepared therefrom that were provided for the comfort and instruction of the visitors. It was rare to find a person who did not like the flavor of some one of the various preparations.

One of the chief difficulties attending the introduction of the American product in Europe is the problem of transportation. The humidity necessarily attendant on ocean transportation affects maize in a particularly troublesome way—to a greater degree, in fact, than other cereals. It is useless to attempt to secure popular approval of a food product which reaches the consumer in a moldy or decayed state. We, perhaps, have all had some experience with eating mush made from musty maize meal, and we are not prepared to demand that others should like it. In order to obtain the best results, maize intended for shipment abroad should be kiln-dried before shipment. In this condition the material keeps perfectly. It is true that this implies expense, and the price at which the product can be sold will be correspondingly increased. But this is better than to furnish a poor article which will not only disgust the consumer but create an enduring prejudice which it would require many years' consumption of a properly-prepared product to remove. The maize used at the Glasgow Exposition was kiln-dried and ground before shipment. European millers do not understand grinding maize, and hence the necessity, at least for a time, of having it ground before exportation. Foreigners who object to maize are generally prejudiced by use of the European-grown article, which is both inferior to the American product, and, in addition, has not been properly ground or baked. In Ireland maize is much used as mush or "stirabout," as it is called there, and its introduction dates from the famine of 1848. At first the peasants did not like it, reaching Ireland as it did in poor condition, but hunger at first drove them to its consumption, and this has continued ever since from choice, and at present Ireland consumes more maize as human food than any other country in Europe. A striking instance of the popular prejudice against the use of maize occurred in Glasgow a few years ago. One of the overseers of the poor proposed to use maize instead of a costlier food for feeding paupers. In a subsequent election he was overwhelmingly beaten on the plea that he had tried to force on men, although paupers, a food which was only fit for pigs.

Special Agent Murphy, who has had charge of the work of introducing maize in Europe, suggests that a large retail grocery store should be selected for each city or town, in which a small kitchen should be set up where all kinds of maize products could be prepared by an expert baker and distributed freely to the public. At the same time appropriate documents in circular form could be distributed on which the value of maize and its uses should be duly set forth. A few weeks' effort of this kind would make the district thoroughly acquainted with the food and build up a good trade for the grocer. By this system every man, woman, and child would be given the opportunity of making a practical test of the merits of maize as a food when transported under proper conditions and skillfully prepared for the table. The giving away of food is a rare spectacle in Europe, and many would be attracted by this novelty who otherwise would never give the subject a thought.

Among others who have tried corn bread and kindred products may be cited that distinguished commoner, Hon. W. E. Gladstone, who says that it suited his taste perfectly, and that he would be happy to see the British people taking more of American maize than they had been doing in the past.

The work of the Department of Agriculture has been much favored by the assistance of our consular and diplomatic agents, who have afforded every facility in their power to the distribution of useful information on this subject. Our Consul at Cadiz writes that he is certain, if the value of this great cereal were thoroughly understood, it would soon become a kitchen staple in Spain. All kinds of food products in that country are costly, and the poor masses would gladly welcome a cheaper and equally nutritious diet. Our Minister at Copenhagen says that Indian corn is only slightly known in northern Europe as human food, but that by a systematic effort it can be brought into general use in all the Scandinavian countries. In Belgium, our Consul at Brussels is of the opinion that the introduction of maize would prove a veritable blessing. Its use is now not known as an article of human diet. The peasants live chiefly on black bread, while the more affluent use wheat. When once the people are convinced that maize is a valuable breadstuff, there will at once be a great demand for it, and this demand must have a happy effect on the home market. The Consul at Vienna is of the opinion that there is room in Europe for several hundred million bushels of American maize every year, and only a proper effort is necessary to open this vast market to American producers. It is evident from this consensus of opinion that there is a bright future in store for American maize in the near opening of a European market which will take our surplus, relieve the home market, and secure a better price for every bushel of Indian corn grown in the United States.

One curious incident remains to be reported in connection with this effort to build up a new market for our products in Europe. The *Milch-Zeitung*, published in Bremen—being the chief organ of the dairy interest in Germany—has a long, and for the most part favorable, review of the "Report on the Use of Maize in Europe" in its issue of Feb. 20, 1892. At the close of the article, however, is found this surprising statement:

> It should not be forgotten, however, as is often the case, to call attention to the fact that, according to our modern experience, the use of maize as food for our domestic animals is likely always to be of a very limited nature in order to prevent injurious effects. For oxen, and especially for horses, is the use of maize as a food likely to find its widest application.

From the above it is seen how deep the prejudice against the use of maize, even for animals, has taken root in Europe. It is evidently the firm belief, among even the more intelligent people, that its use is attended with a certain danger, and should be confined to oxen and horses kept at active work. When these false notions are dispelled, the foreign market for our great cereal will be widely extended, and new source of prosperity be opened for the American farmer.

Maize as Compared With Other Cereals as a Food Product.

The question may arise whether there is a just basis for our contention that maize is entitled to high rank as a food product. If such be not the case no amount of advertising or introduction can avail to secure for it a permanent and prominent place abroad. Should it prove inferior in nutritive powers to wheat, rye, and oats it must be content to occupy a lower rank both for man and other animals. The best test for a comparison of this kind is actual use. The long years of use of these articles in this country by man and beast have shown its high and enduring character as a food. Whether it be used for producing muscle for labor, or as a means of fattening animals, it has been found to be of superior value to any of the other cereals produced in the United States. It feeds a large portion of the laboring men of the country, especially in the South. It is the almost universal food for fattening hogs. In every function in which it has been used it has been found to honor equally well the high place accorded it, not only from experience but also from a study of its chemical composition.

Food to be perfect must give to the body all the necessary constituents to supply tissues for its growth and to take the place of the waste of tissue which is a necessary attendant on the functions of life. That article of food which is best calculated to supply the wants above mentioned would be, of necessity, the most valuable for food purposes. In general it may be said of foods that they should be fat-producers, muscle-producers, bone-producers, and, most of all, blood-producers, since it is through the blood that all the tissues of the body are formed and nourished. The food should also supply to the body the necessary materials which by consumption within the body supply animal heat. A proper balance between all these functions of food is necessary to constitute any one article pre-eminently a food.

As fat-producers are generally reckoned the starches and sugars which the food contains, those parts of foods containing nitrogen, commonly called albuminoids are supposed to serve chiefly for the nourishment of the muscular tissues and to supply the nitrogenous principles of the blood. In the ash constituents of a food are found those mineral substances which are necessary to supply the tissue of bone, such as phosphoric acid and lime, which are its chief constituents. The fats and oils of food are supposed to be pre-eminently the source of animal heat, furnishing it by their combustion in the lungs and tissues of the body under the action of oxygen.

In cereals along with starch may be reckoned the entire content of such foods in carbo-hydrates, viz, starch, dextrin, sugars, and digestible fiber. The albumenoids of cereals contain different bodies, of which nitrogen is the essential constituent. In wheat, for instance, one of the chief albuminoids is gluten, while in maize other forms of nitrogenous matter prevail. Among these have been detected three bodies partaking of the nature of globulins, one or more albumens, and a nitrogenous body soluble in alcohol. This body, which is peculiar to maize, has been called *zein*, from the generic name of the plant *zea*.

The average composition of the maize of the United States, deduced from a large number of analyses, is shown in the following table of per cents:

Starch and allied bodies	70.69 per cent.
Albuminoids	10.46 "
Water	10.04 "
Oils	5.20 "
Fiber	2.09 "
Ash	1.52 "

It will interest the farmer who desires to know more about the crops he grows to call attention to the comparative composition of the principal cereals based upon hundreds of analyses of samples grown in this country. Such a comparison will be found in the following table:

	Hulled Oats.	Wheat.	Rye.	Barley.	Maize.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Starch and allied bodies	67.00	71.98	74.52	72.77	70.69
Albuminoids	14.81	11.95	11.92	11.33	10.46
Water	6.93	10.27	8.67	6.53	10.04
Oil	5.14	2.16	1.94	2.68	5.20
Fiber	1.28	1.80	1.46	3.80	2.09
Ash	2.15	1.84	2.09	2.89	1.52

From the above data it is possible to form a correct idea of the comparative value of maize as compared with other leading cereals, viz., wheat, oats, rye, and barley.

First of all it will be seen that in the water content of maize there is a striking resemblance to wheat. It has only slightly less water than wheat and considerably more than hulled oats, rye or barley. In its content of ash it has the first position, since a large ash content means less of more nutritive matter. This is also an important item when soil exhaustion is considered. Those crops taking less of the mineral matter of the soil are by that much less injurious in so far as the phosphoric acid and potash of the soil are concerned. In regard to oil or fat, maize also easily takes the first place, excluding comparison with hulled oats, a form in which oats rarely enters into commerce. It contains more than twice as much oil as wheat, three times as much as barley, and two-thirds as much as hulled oats. When we consider digestible corbo-hydrates, meaning by this term starch, sugar, dextrin, and digestible fiber, we find that maize holds about an even rank with the other cereals. It has more digestible corbo-hydrates than hulled oats, almost the same as wheat, and slightly less than rye or barley. As to the quantity of indigestible matter, meaning by that fiber, it is seen that maize occupies a mean position in the list. It has not so large a percentage of indigestible fiber as hulled oats, a slightly larger quantity than wheat or rye, and a considerably less quantity than barley.

In regard to the nitrogenous matters, it may be seen from the table that the first place must be awarded to hulled oats. Compared with the rest of the cereals mentioned, maize has a slightly lower percentage of these valuable constituents.

In general, it may be said that the most important food constituent of the cereals includes that group known as carbo-hydrates. Next in importance come the albuminoids. The third class embraces the oils or fats, and last of all comes the ash. The fiber and water may be left out of the count in reckoning the food value of any cereal.

As indicated above, maize is fully equal in value to any of the cereals making up in its content of fat any deficiency that may be noticed in its nitrogenous matters and digestible carbo-hydrates.

It is thus seen that the chemical data fully confirm the results of experience.

Some Statistics Respecting Maize.

The production of maize is the leading agricultural industry of the United States. There is not a State or Territory where it is not extensively grown. The area cultivated in maize in this country now exceeds 70,000,000 acres. In 1889 it reached 78,000,000 acres. Even in the cotton States a larger area is devoted to maize than to cotton. In the great wheat belt of the Ohio and Missouri Valleys maize is grown on more acres than wheat. The total area annually planted in maize is greater than all New England, New York, and New Jersey combined; greater than the whole area of England, Ireland, and Scotland; greater than the total area of Belgium, Holland, Switzerland, Denmark, Portgugal, and Greece. It more than equals in extent the land cultivated in France, Germany, or Austria-Hungary, and is three-fourths as large as all the land seeded to wheat in Europe.

The magnitude of the crop is quite proportional to the immense area under cultivation. The corn crop of 1891 in the United States is estimated at 2,060,154,000 bushels, a sum so large as to be almost beyond the grasp of the intellect. The value of this crop is equal to the whole of our National debt, both interest and non-interest bearing. Sixty-eight per cent. of this vast yield were grown in the eight States of Iowa, Illinois, Missouri, Nebraska, Kansas, Indiana, Ohio, and Kentucky. In these States nearly 43,000,000 acres were cultivated in maize, and the estimated yield was 1,399,022,000 bushels. The total acreage of last year's crop was 76,250,000, an area which has only been exceeded once, viz, in 1889, when the area devoted to maize was 78,319,651 acres.

Iowa leads all the other States both in area planted in maize and in the total crop produced. In 1889 Iowa had 8,859,898 acres in maize, with a total yield of 349,966,000 bushels. The acreage and yield for 1891 are almost the same as in 1889, while in 1890 there was a notable falling off both in area and yield. The other States named above follow in the order named as respects acreage and yield. The average yield per acre for the whole country for the 10 years from 1870 to 1879 was 27.1 bushels; from 1880 to 1890, 11 years, it was 23.8 bushels, showing a decided exhaustion of the soil and a consequent falling off in yield. It is the opinion of the Statistician of the Department of Agriculture that this decrease in average yield is due solely to meterological conditions and not to soil exhaustion, and he cites in support of that statement the fact that in 1891 the average yield of the crop is nearly 27 bushels per acre, thus approximating the highest figures ever obtained.

It must be admitted, however, by everyone who has engaged practically in the growing of maize, that the elements of fertility in the soil are diminished by the method of culture which has been heretofore practiced. There is now a prospect for a change in the matter, and part of the yield which is now obtained must be attributed to improvements in agriculture rather than to the natural fertility of the soil.

Compared to all land under cultivation, Iowa has 250, Illinois 224, Delaware 178, Indiana 160, and Missouri 155 acres per 1,000 devoted to maize. Other States that have over 100 acres per 1,000 in maize are Maryland, Tennessee, Kentucky, Ohio, and Kansas. New York has only 23 acres per 1,000, while the New England States, the Pacific Slope, and the arid Territories has less than 20 acres per 1,000 in cultivation planted to maize. One most important feature in connection with this crop is the fact that it finds a home market. While the desirability of increasing its foreign market is acknowledged by all, yet it must not be forgotten that there is no probable expansion of the foreign demand which will in any way begin to compete with home consumption. Only about 4 per cent. of the crop now finds a market to foreign ports, while fully 80 per cent. of it is consumed within the Counties and mostly on the farms where it is grown. How different is this from the disposition which is made of our other two great agricultural crops, cotton and wheat. Cotton is almost all sent out of the States where it is grown, and the greater part of it abroad. Our wheat is chiefly consumed without the locality of its production, and a very considerable part of it is sent abroad. Maize is therefore preeminently our patriotic crop—an American crop for Americans.

As it has been so shall it be. The crop that is consumed on the farm, as will be shown below, is the crop the farmer best of all can afford to grow. It is the home market that brings prosperity and enduring wealth. The history of the world shows that great wealth never has come to an exporting agricultural community. With the possible exception of rice and wheat, maize is the most widely-used food crop of the world. We may yet see the day when it shall occupy first place.

The Future of Our Maize Fields.

It has been intimated above that the supply of plant-food in the soil available for the growth of maize is not unlimited, and that with the prevailing methods of culture there must of necessity be a progressive exhaustion of the soil. The facts of experience only corroborate the deductions of science. The maize fields do not now produce the phenomenal crops which as virgin soil they so lavishly brought forth.

The three most important elements of plant food are potash, phosphoric acid, and nitrogen. In a virgin soil these elements usually exist in great abundance and are easily available. But successive crops, without any restoration of the materials removed, rapidly diminish the productive power of the fields. What has been the method of culture in the great maize-producing areas? Crop after crop is grown successively on the same ground. The pitiful restitution of dried stalks to the soil is generally denied. They are broken down, raked up and burned. The potash and phosphoric acid, it is true, which they contain may be saved in this way, but the nitrogen therein, the most valuable constituent of all, is utterly wasted.

The maize crop of the country removes annually from the soil more than 21,000,000,000 pounds of nitrogenous matter, which, containing 16½ per cent. nitrogen, is worth about 18 cents a pound. Of this amount about 12,000,000,000 pounds are in the grain and 9,000,000,000 pounds in the stalk and blades. Nearly 300 pounds per acre represent the nitrogenous matter required for the maize crop, or approximately 50 pounds of nitrogen worth fully $8. Of potash the maize crop consumes annually two and three-quarter billion pounds, of which four-fifths are found in the fodder and only one-fifth in the grain. Of phosphoric acid over 2,000,000,000 pounds are required, of which two-thirds are in the fodder and one-third in the grain. These enormous quantities of plant food are annually removed from the soil, and those who are acquainted with the methods of farming practiced in the newer portions of our country are aware that maize stalks and straw are usually regarded as nuisances, to be removed as early and as speedily as possible.

It is not tilling the soil but killing it that is practiced. Stables are removed to get out of the way of the accumulating manure, and the maize stalks are raked together and burned to prepare the field for a new crop. It is true now that in many localities the waste of such a proceeding, especially in nitrogen, is fully understood; but it must be confessed that over vast areas of our agricultural lands there is no adequate conception of the idea of the possible exhaustion of the soil, and no systematic method of preventing it is practiced. The refuse of the crops, the straw, stalks, etc., are put out of the way as easily and quickly as possible, and without thinking of the robbery which is thereby committed. The stores of plant food which have been accumulated in our virgin soils are indeed great, but they cannot stand forever this constant drain.

If we place the annual contribution of potash per acre at 40 pounds, the number of crops which could be produced in a given depth as far as this constituent of the soil is concerned is easily computed. The weight of dry soil per acre to the depth of nine inches is approximately 3,000,000 pounds. A soil containing three-tenths of a per cent. of potash would have 9,000 pounds per acre, which at 40 pounds a year would last for 250 years. But fortunately by the decomposition of feldspathic rocks and other minerals containing potash, and also by the transfer in various ways of the potash of the subsoil to the soil, nature has provided against the entire exhaustion of the supply. Thus it happens that in many parts of the world where fields have been under cultivation for hundreds of years there is still a sufficient amount of this mineral substance to insure the production of a crop.

The available quantity of phosphoric acid in the soil may be estimated in the same way. The mean content of this substance may be taken at fifteen hundredths of one per cent. The total quantity per acre to a depth of nine inches is therefore 4,500 pounds. Taking the contribution of phosphoric acid to each crop at 20 pounds per annum, the present supply of that substance would suffice for 225 years.

The natural reserve of nitrogen would suffice for a somewhat shorter time. The natural inference from all these data is that the future of our maize crop depends on the application of scientific agriculture to its production. It has been noted that the average yield per acre is about 25 bushels. In the great maize States it is much higher, being nearly 37 bushels in Iowa, 34 in Indiana and Illinois, and 30 in Kentucky. Can this yield be increased? The answers must be in the affirmative. Already in some of the New England States under intensive culture the yield has been brought far above the averages mentioned above, and the data furnished by careful experiment show how this can be accomplished on a larger scale. Give to the soil the food the crop demands, and the crop will more than pay the expense.

HORSE-SHOEING.

A Necessary Evil—It Should Be Done so as to Cause the Least Possible Injury—Bad Methods and the Best Ones.

BY WILLIAM DICKSON, VETERINARIAN TO THE STATE FARMERS' INSTITUTE OF MINNESOTA.

[From the United States Department of Agriculture, Special Report on Diseases of the Horse.]

ALTHOUGH the subject discussed in the present chapter may not, strictly speaking, be entitled to a place in a category of the ailments to which horseflesh is heir, bad and indifferent shoeing are such prolific sources of both disability and disease in the noblest of all our dumb animals, that no excuse is necessary in claiming for it equal attention at the hands of those interested.

It has sometimes been asserted that the history of every horse is a record of human endeavor to mar his utility. While the accuracy of such a sweeping assertion may fairly be called in question, there are undoubtedly respects in which the horse in domestication is very often the victim of his owner's ignorance, indifference, or even mistaken kindness, and in no particular is this more strikingly conspicuous than in the ordinary treatment of organs so vitally essential to his usefulness as his feet. No horseman questions the truth of the aphorism "no foot, no horse," and yet in no portion of that animal's economy has he suffered so many wrongs, or as a natural consequence endured so much uncalled-for suffering as in his feet, and to shoeing a very large proportion of these evils is, beyond all doubt, directly or indirectly referable.

Unfortunately, under certain conditions, shoeing is an almost unavoidable consequence of the horse's domestication, and, although we may have no wish to uphold the traditional methods, we are driven to the conclusion that an artificial protection of some kind for the horse's foot is very frequently one of the penalties which civilization inexorably exacts. That the ordinary iron shoe is the best and least hurtful means that could be devised, I am reluctant to admit; but, so far, even American ingenuity has failed to develop anything better suited to the purpose. That the system of horseshoeing as it obtains, even in the most skillful hands, is pregnant with mischief to the foot, no one who is conversant with the facts will venture to deny. As a matter of physiological fitness the shoe and its mode of attachment are utterly indefensible. Each time a horse is shod—every nail driven—means so much injury to the foot. The better the job the less that injury is; but there is no such thing as absolute immunity from an evil which must always exist in inverse ratio to the skill displayed in the execution of the work. We have, however, to deal with facts as we find them, and if we have, day after day, to impose upon our horses work of a nature which entails upon their feet more waste of horn than nature can replace during the ordinary interval of rest, we are obliged to adopt a defense of some kind. It would be futile to inveigh against the form of protection in universal use, unless we were prepared with a substitute not open to same or equally-serious objections.

There is, however, at least one very large and important class of horses to which shoes are by no means an habitual necessity, namely, our agricultural horses. The nature of their work, the pace at which they are required to perform it, and the character of the ground over which they ordinarily move, all unite to render artificial protection for their feet, save under exceptional circumstances, altogether uncalled for. When this is so, and when it is conceded that shoeing is, even under the most favorable circumstances, an evil (albeit in some cases a necessary one), a frequent cause of disease, and therefore a direct source of loss, it is a matter of deep regret that such a large majority of our farm horses, the very mainspring of our agricultural existence, should be needlessly subjected to a mutilation which curtails the period of their natural efficiency and too often renders their life thus shortened one long-continued agony. For it must be borne in mind that our ordinary village blacksmith, of whose daily work horseshoeing forms but an insignificant and by no means either an easy or pleasant part, is not always the most competent of workmen.

Without wishing to do injustice to our rural knights of the anvil, it is nevertheless a lamentable truth that these votaries of the buttress and drawing-knife are, all the world over, so wedded to a number of traditionary practices, so heinous, so irrational, so prejudicial to the interests alike of the horse and his owner, that one might well be excused for wondering whether their mission were not to mar instead of to protect the marvelously-perfect handiwork of the Creator. Ignorant alike of the anatomy, physiology, and economic relations of the parts, they mutilate, they cut and carve as whim, prejudice, or time-honored custom dictates. Disaster, it may be slowly, but surely, follows, and all too often the poor dumb creature's suffering foots the bill. Let us glance in passing at some of these traditional practices.

Foremost among them is the insane habit of trimming the frog and thinning out the sole till it visibly yield to the pressure of the operator's thumbs. The frog is nature's cushion and hoof-expander, placed there by an All-Wise hand; by its elasticity it wards off concussion from the less elastic portions of the structure, and by its resilience assists in maintaining the natural expansion of its horny ambit; that is to say, it does so in its natural state, but the drawing-knife's touch is fatal to it. Once cut and carved and deprived of pressure, those very acts cause it to shrink, dry, and harden, and at once lose those very attributes which constitute its usefulness to the foot. Robbed of its elasticity and resilience, it is incapable of discharging its allotted functions—both as a cushion and as an expander it is a dead failure; indeed, it is worse, as in its altered character it is now a menace instead of a protection, a bane rather than a boon to the foot that wears it.

The destruction of this important factor having been thus provided for, the operator probably next turns his attention to the sole, which, by all traditions of the craft, must be pared down until only a thin film of soft, partially-formed horn is left to protect the living structures within against injury from the substances with which the foot necessarily comes in contact. Nor does the mischief stop here. The sole itself, or what is left of it, consists not of soft, moist, half-formed horn, which dries and shrinks on exposure to the air, and thereby entails a further and a still more serious injury on the foot.

The sole of the horse's hoof is secreted by the velvety tissue dependent from the membrane which invests the pedal bone, the minute, hollow, fibrous processes of which penetrate it and minister to its support. In the mutilated, shrunken sole these delicate fibers are pinched in the lessened caliber of the pores; the source of supply is cut off, and the process of repair retarded if not absolutely arrested. There seems to be a fascination about this work of destruction, and the incompetent workman next addresses himself to the self-imposed task of improving upon nature by removing the bars and what he calls, on the *lusus a non lucendo* principle, "opening" the heels, a process which, in plain language, means opening a road for them to close over. On this poor, maimed foot a shoe, often many sizes too small, is tacked, and the rasp is most likely called into requisition to reduce the foot to fit the shoe; for although it is apparently of little moment whether the shoe fits the foot, it is indispensably necessary that the foot should, somehow or other, be got to fit the shoe, and horseshoeing, like other arts, must needs sacrifice on the altar of appearances. It is sad that art and nature should so often be at variance, and that what satisfies the one should outrage the demands of the other.

The foot is now shod and protected from undue wear, to be sure, but at what a sacrifice! Robbed of its cushion, its natural expander; its lateral braces removed; its sole mangled and its natural repair arrested; the hairlike fibers which make up the horny wall crushed, deflected, and their nutritive function impeded by an unnecessary number of nails; robbed by the rasp of its cortical layer of natural varnish, which retains the moisture secreted by the economy, the strong walls become desiccated and weakened, and the foot is in a very sorry plight indeed. To some this picture may seem overdrawn, but it is nevertheless a matter of daily occurrence.

Of course, even among agricultural horses, there are individuals which cannot work unshod; but these are exceptional cases. Then, again, in Winter, when the usual snowfall is wanting, most horses' feet will require protection; but nowadays an owner has himself to blame if he submits to having the work done in that wrong-headed and ridiculous manner, which has called into existence such a long and dismal category of disease and misery.

The horse's foot is, after all, a good deal of what we make it, and if our horses, from their colthood up, had their feet more carefully attended to, and especially were they invariably to stand while in confinement on some material less deleterious to the hoof than dry, wooden flooring, from which the foot suffer no attrition whatsoever, and by which it is moreover depleted of its natural moisture, their feet would, in the period of the animals' active usefulness, be found to be better shaped, harder, less brittle, and in every way better suited for the work required of them.

In the East Indies, where pony racing is very popular and the purses exceedingly valuable, many expedients are resorted to to smuggle a pony that is over hight under the 13.2 standard (the maximum hight for ponies) among them, of course cutting down the feet as far as can be done with impunity. I frequently observed that those of the handsome little Arabs and Walers (Australians), which came up oftenest for measurement, and whose feet were in consequence most frequently pared down (albeit by an artist at the business, as those little animals were too valuable for their owners to accept any risk of injury) were those whose feet subsequently stood best the trying ordeal of training and racing on the adamantine going of the tropics. The moral of this is obvious. It might even be possible (I do not mean necessarily in this particular way) in the course of generations to develop a horse whose feet should be so improved that he could do all sorts of work on all sorts of going barefoot with impunity; but this would imply an amount of self-sacrifice in the present for the benefit of remote prosperity which is hardly to be looked for in this practical age, and the contention of enthusiasts that all horses could and should, under all circumstances, go unshod is, I fear, utopian and impractical.

I have endeavored to show that shoeing, as generally, or at all events very frequently, practiced is a fruitful source of injury to our horses' feet; but as we

cannot altogether dispense with the custom, let us turn to a consideration of the means which lie in our power of minimizing the attendant evil as much as possible.

There is one instrument which I should like to see, if possible, omitted from the shoeing outfit of every farrier, and that is the drawing-knife. If our blacksmiths would use their knives less and their heads more in the execution of their very important and by no means easy duty, our horses would be the better for it, and so would their owners. There is no great mystery surrounding the subject, and the application of ordinary common sense, in lieu of the barbarous routine which has been so long handed down from generation to generation until it has actually become a portion of the blacksmith's creed, would go a long way toward obviating many if not most of the cruel wrongs to which our horses' feet are day by day needlessly subjected.

The outside, or horny wall, and that portion of the sole which is in immediate contact with it, on which the shoe should rest, are the only portions of the foot which require to be interfered with in preparing the foot for the shoe, and all the trimming that is necessary can and ought to be effected by means of the rasp. The frog and sole should on no pretext whatever be meddled with, save to the extent I have indicated. Their presence in their entirety, and in their natural state, is essentially necessary to the well-being of the foot, and neither brooks the touch of the steel.

There may be differences of opinion among authorities as to minor details in shoeing, but there is at all events one issue on which it is satisfactory to know that there is absolute unanimity; one practice which all alike utterly condemn; and that is the irrational treatment of the frog and sole, to which I have already

PLATE XXXXII.

1. THE FOOT READY FOR THE SHOE, SHOWING FROG AND BARS AS THEY SHOULD BE LEFT.

2. FRONT VIEW OF SCOOP-TOE ROLLING-MOTION SHOE.

3. HIND FOOT SHOE TO BALANCE THE ACTION.

4. SIDE WEIGHT SHOE FOR HIND FOOT.

alluded. There is, however, no particular in which the thinking horse-owner finds himself more frequently at variance with his blacksmith, for there is no detail in all the latter's misconceived procedure to which he clings with such colossal obstinacy, which is not open to argument, and which sets common sense at defiance.

It is a strange fact, but none the less true, that all the world over the farrier is the one among all our artisans who is least amenable to suggestions from his employer. Other mechanics permit their patrons at least some discretion as to the size, shape, and structure of the article desired, but when the ordinary horse-owner takes his animal to the shoeing forge he has usually to place himself absolutely in the blacksmith's hands, and give him *carte blanche* to cut and carve at his unholy will, or else take his horse elsewhere, and there probably find himself no better off. The result is that his horse's feet are mercilessly mutilated instead of being left as nearly as possible as nature in her ineffable wisdom made them.

Plate XXXXII, Fig. 1, shows the only parts which should be reduced when a foot is properly prepared for the shoe. Sufficient care is not always given to shortening the hoof so that its angle should conform exactly to the inclination of the limb. It would be misleading to lay down any arbitrary degree of obliquity. The angle differs in different cases, and the natural bias of the superimposed structures is the only safe guide to follow. More than one instrument has been devised for ascertaining the correct degree of obliquity, some of them simple and efficacious; but an inspection of the foot in profile is usually the best way of deciding. Too much importance cannot possibly be attached by the workman to this and the succeeding step, namely, leveling the ground surface of the foot, as the slightest departure from absolute exactitude here renders whatever amount of care he may devote to the completion of his work worse than useless. The very smallest deviation from the perpendicular entails disastrous consequences not only on the foot but on the entire limb. In the foot itself, when the weight is borne unevenly, the lowest parts receive an undue share; the pressure retards the growth of new horn, and the foot in consequence becomes weakened, distorted, and deformed. In the limb, deflected as it is by an uneven basis from the ground surface to its union with the trunk, the angle of incidence of the weight is imposed unequally, and bone and tendon mutually suffer from the strain.

THE SHOE.

The shoe should be as light as the weight of the animal and the nature of the work he is expected to perform will admit of. I am not now writing for the trotting horseman, who knows his own business better than I can teach him. In referring to shoeing smiths it is possible that I should have made an exception in favor of the finished artist who arms the feet of the trotter with those masterpieces of skill and ingenuity which balance his gait, level his action and perfect the rhythm of the motion with which he spurns the flying track behind him, when thousands of anxious eyes watch his every footstep, and fortunes depend on the length and tirelessness of his stride. That is a branch of the business which has received an amount of attention and achieved triumphs unrivaled or unapproached in other lands. Yet have I seen that artist (for he is nothing less), after fitting and setting a shoe, perfect in workmanship as a piece of jewelry, reach out for his tool box and rasp the foot from the coronary band to the plantar border, and thus wantonly court disaster, for what reason let him tell us if he can.

Heavy shoes not only burden the animal which is condemned to wear them, for there is truth in the old adage, "an ounce at the toe means a pound at the withers;" but they also increase the concussion inseparable from progression, and even in the trotter, whose work is meted out to him with judicious care, although the weight doubtless accomplishes the work for which it was intended, it is a draft at usury on the horse's future soundness, which that animal is bound to take up at maturity.

The legitimate mission of the shoe is to prevent undue wear of the walls, and a light shoe will do this quite as well as a heavy one; it is moreover entirely erroneous to suppose that a heavy shoe necessarily wears longer than a light one, as experience proves the contrary, in many instances, to be the case. Even among our mammoth draft horses, whose shoes must of course be made with reference to the weight they have to bear and the inordinate strain to which they are subjected when the animal which wears them is at work, I am not prepared to admit that it is by any means necessary to add to the concussion to which his feet are unavoidably subjected, by several pounds of unyielding iron on each foot, when shoes weighing half as much would serve the purpose equally well. The lamentably short career of our city draft horse, which is usually determined by foot lameness of one kind or another, is largely attributable to the aggravated amount of battering on hard pavements which his needless weight of armament entails.

The upper surface of the shoe should be perfectly level. If the plane of the web inclines from outside inward, it greatly adds to the unavoidable tendency to contraction which shoeing invariably entails, and there is a wealth of unwisdom in most of the clumsy attempts at mechanically spreading the heels by making the inclination in the contrary direction. It is true that in cases of malformation, or grave alteration of the contour of the foot, good results are obtainable by this or other mechanical means, but all such heroic remedies should be undertaken only at the instance and under the immediate supervision of the veterinary practitioner; otherwise they are liable to do harm instead of good.

In France dilatation of the hoof by mechanical means is advocated and practiced more than elsewhere, but the operation is performed with the utmost exactitude, scrupulous care and delicacy, and under the closest professional supervision. Even under these favorable conditions the slightest accidental deviation not only defeats the object in view, but occasionally leads to untoward results. When contracted feet have to be expanded there is a far more simple, safe, and at the same time effective means of attaining that end to be found within the foot itself. By lowering the walls at the heels, so as to restore frog pressure, the latter speedily recovers its lost characteristics, and in a healthy condition gradually and naturally accomplishes one of the very purposes for which the Great Architect placed it there.

It would seem to be unnecessary to say that the shoe should be so shaped as to conform exactly to the natural tread of the foot, yet a very common practice obtains of using a shoe of a uniform shape, often less in circumference, if such a term is permissible, than the foot on which it is to be nailed, and then rasping down the foot to fit it. It is obviously easier to make the foot to fit the shoe than it is to make the shoe to fit the foot; a stroke or two of the rasp effects the former, but it is a far more arduous undertaking to modify the size and shape of the shoe. The outcome of this pernicious practice is disastrous in the last degree, more especially so in a dry climate like ours, as the walls thus robbed of their natural covering permit the moisture of the foot rapidly to evaporate; and the horn fibers, which

make up the outside walls, instead of being compactly knit together, readily disintegrate, and in the course of a shoeing or two those very portions in which the nails should obtain firm hold possess little more adhesion than a bundle of broom corn. If the shoe fitted as it ought to do a touch of the rasp under each clinch would be all that was necessary, and even this much might advantageously be dispensed with. Plate XXXXIV illustrates correct and incorrect fitting, Fig. 1 being the right and Fig. 2 the wrong way.

FITTING.

In many countries what is called hot-fitting—that is to say, after the foot has been trimmed and leveled, momentarily applying the shoe at a red heat to the foot—is generally practiced to the almost entire exclusion of any other method, and the system is not only found to answer, but receives the indorsement of the most competent authorities. The climatic conditions which render the practice open to objection in this hemisphere fortunately enable us to dispense with a procedure against which there exists in the minds of many horse-owners a not unreasonable prejudice, which, however, is directed at the abuse rather than the intelligent application of a proceeding not necessarily hurtful in itself. The advantage conferred by hot-fitting consists in the fact that a more accurate accommodation is by this means more readily obtained than by any other method, and the contact between hoof and shoe can thus be made more intimate and enduring. In moist climates it is only by means of hot-fitting that a set of shoes can be got to remain on for a reasonable length of time; but in no part of this country have I found any difficulty of this nature; indeed, on the contrary, shoes are usually allowed to remain on too long, especially in the agricultural districts. It has frequently occurred to me, when in the discharge of my duties as Veterinarian to the Farmers' Institute of Minnesota I have remonstrated with some local blacksmith at the number of gigantic nails he employed in affixing a shoe, that I have been assured that did the shoe not remain on for several months his employer would be dissatisfied and would transfer his custom elsewhere. Nothing could be more short-sighted nor more unreasonable than such conduct.

The hoof of the horse is in shape a truncated cone with the base downward; as it grows the circumference of the base consequently increases, and the shoe fitted when it was newly put on after a time becomes too small. It would be just as reasonable for a horse-owner to buy his little boy a pair of shoes, which just fitted him when he was six years old, and then expect him to wear them until he was 12, as it is for him to require his dumb servant, who cannot protest against the infliction, to wear his shoes for months in succession without resetting. A badly-fitting shoe is to a horse as painful as a tight boot is to his owner, and under no circumstances should shoes be permitted to remain on more than a month or five weeks at the outside. Many animals require to be reshod even more frequently. It is only when an owner lets his parsimony overcome his reason that he subscribes himself to a penny-wise and pound-foolish policy, which can only result, as such policies invariably do, in a loss to their exponent.

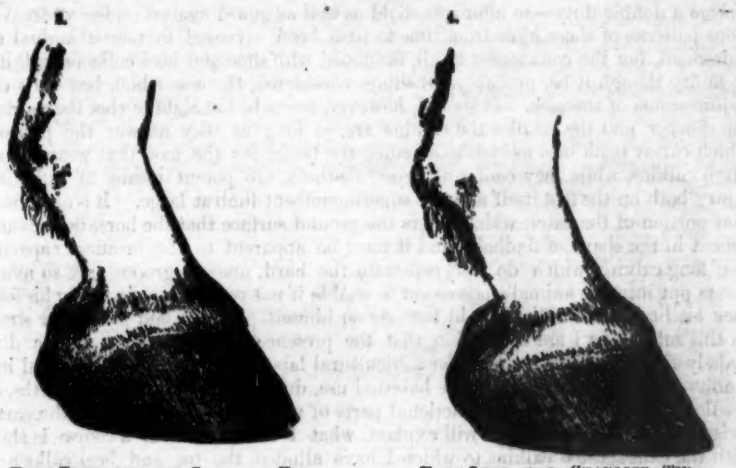
NAILS.

The fewest nails, and these of the smallest size, that will ensure the shoe remaining on for the proper length of time, is a rule that should never be departed from. The nail holes should not be punched too fine—that is, too near the outside edge of the web of the shoe (this is a very common failing of "keg shoes"); if punched coarser the nails will take a thicker and lower hold of the walls, and in this way obviate their having to be driven so high up as to approach dangerously near the sensitive structures. Two of the commonest errors in shoeing are using too many nails and these of an altogether unnecessary size, and then driving them too high up into the walls. If a perfectly-level bearing has been obtained—as ought to be the case—it is astonishing how few and how small nails will hold the shoe firmly in its place; but let the fitting be carelessly done, then, no matter how the shoe may be nailed on, but a short time elapses ere the clinches open and the shoe works loose. When we bear in mind that the wall of the hoof consists of a number of hair-like tubes cemented together, and that each tube is one of an infinite number of minute canals, which diffuse throughout the horn a fluid that nourishes and preserves it, it will be readily understood that each nail driven into the wall deflects those little tubules, probably absolutely closing those with which it comes into actual contact and hurtfully compressing those lying half way between the nails, thus impairing if not destroying their utility and cutting off the supply of a material necessary to the foot's existence. If we could dispense with nails altogether our horses' feet would be immeasurably better off. This, unfortunately we apparently cannot do, but we have it in our power to minimize an evil which, at present, at all events we cannot entirely avoid. There has recently been patented in England a nailless horseshoe, for which the patentees claim extraordinary excellence. I have not yet been able to see one of these shoes, but if they will enable us to dispense with the use of nails they will confer a priceless boon on horseflesh generally. From the description given by the patentees I fail to see, however, how the shoes can be kept sufficiently firmly in place, nor can I glean from the same source that the new method of attachment (by means of a metal band and studs) is equally efficacious with the old, or less injurious.

There is, however, one shoe, without some allusion to which any essay of this kind would be incomplete, namely, the "Charlier shoe," invented some years ago by M. Charlier, a well-known Veterinary Surgeon of Paris, France, which has never, in my opinion, received either the attention or trial its merits deserve. Common sense and science alike indorse it, and were the system to become more generally known in this country I venture to assert that there is an extremely large number of cases in which it would be found both appropriate and beneficial. For this reason I will briefly describe it. The shoes used are about one-third the weight of an ordinary shoe, and less than one-half the width. In preparing the foot for the shoe and sole frog and bars are left, as they ought to be, absolutely untouched, and a groove is cut, and by means of a knife specially designed for the purpose, in the wall, not high enough to reach above the sole level, and less than the thickness of the wall in depth. Into this groove a narrow but thick band of iron is sunk and nailed to the foot by means of four to six conical-headed nails, the heads being countersunk in the shoe. The advantage of this method of shoeing is that the frog, bars, and a portion of the sole come to the ground exactly as if the foot were unshod, and one and all participate in weight-bearing as it was obviously intended they should, while the wall is protected from wear by the small rim of iron let into its ground surface.

A modification of the system has been suggested by an enthusiast who writes under the name of "Free Lance," which possesses even superior advantages. Under this system only tips or toe-pieces of the Charlier pattern are used, the foot being prepared for their reception, as shown in Plate XXXXIV, Fig. 3. The tips are made with their ground surface broader than their upper face, and the outside edge of the web beveled off so as to follow the angle of the profiles of the foot. Plate XXXXIV, Fig. 4.

PLATE XXXXIV.



FOOT PREPARED FOR CHARLIER TIP. FOOT SHOD WITH CHARLIER TIP.

I have used both the Charlier shoe and the tip in this country as well as in the East Indies, and I am perfectly satisfied that in many respects they are superior to any other model. They are infinitely lighter, the nails are smaller and fewer in number; all steps in the right direction: but the dominant superiority of the device consists in the fact that the frog obtains pressure to the extent contemplated by nature, and in the case of the Charlier tip particularly the exercise of its double function as a buffer and dilator is absolutely untrammeled in anyway by the shoe.

FINISHING TOUCHES.

When the shoe has been fitted, the nails driven, drawn up, and clinched, there should be nothing left to be done. Very frequently, however, it is just at this

stage that the incompetent workman, in the most uncalled for manner, inflicts serious and lasting injury on the foot. If the wall has not been sufficiently reduced in leveling the foot, or if the shoe used is too small, the rasp is required to reduce the projecting parts. (Plate XXXXIV, Fig. 2.) Often, indeed, when there is not even this pretext, the whole surface of the foot is subjected to its relentless touch. No procedure could well be devised which would be more hurtful to the foot. In its natural state the entire hoof, from the coronet to the sole level, is covered by a fine coating of natural varnish, thickest at the upper margin and gradually becoming thinner as it descends. Under cover of this beneficent curtain the new horn is secreted and protected until it has attained maturity. The moisture secreted by the animal economy, necessary to the perfection of the horn, is retained within it, and the prejudicial influences of alternating drouth and moisture are set at defiance. In a very dry atmosphere like ours it is of paramount importance that this beautiful shield should be preserved and fostered, and no name is bad enough for a senseless custom which, to serve no good purpose, robs the foot of a necessary protection which it is beyond the power of art to imitate or replace.

WINTER SHOEING.

The subject of Winter shoeing presents, in many sections of the country, fresh difficulties, for now the shoe is required, in the case of all classes of horses, to discharge a double duty—to afford foothold as well as guard against undue wear. Various patterns of shoes have from time to time been invented to meet this dual requirement, but the commonest of all, fashioned with shoe and heel calks or calkins, is, faulty though it be, probably, all things considered, the one which best suits the requirements of the case. It should, however, never be lost sight of that the shorter, the sharper, and the smaller the calkins are, so long as they answer the purpose which called them into existence, so much the better for the foot that wears them. High calkins, while they confer no firmer foothold, are potent means of inflicting injury both on the foot itself and the superincumbent limb at large. It is only from that portion of the catch which enters the ground surface that the horse derives any benefit in the shape of foothold, and it must be apparent to the meanest capacity that long calkins, which do not penetrate the hard, uneven ground, are so many levers put into the animal's possession to enable if not compel him to wring his feet, rack his limbs, and inflict untold tortures on himself. I have laid particular stress on this subject, as I am of opinion that the presence of navicular disease, a dire malady from which horses used for agricultural labor should enjoy a practical immunity, is traceable largely to the habitual use, during our long Winter months, of needlessly large calkins, only fractional parts of which find lodgment in the earth or ice during progression. I will explain what I mean. When a horse is shod with the exaggerated calkins to which I have alluded, the toe and heel calks are, or ought to be, the same hight, to start with, at all events. Very often, however, they are not, and even when they are, the toe calk wears down on animals used for draft purposes far more rapidly than its fellows at the heel. The result is that the toe is depressed while the heel is unnaturally raised. The relative position of the bony structures within the foot is altered, and the navicular bone, which is not one of the weight-bearing bones, is brought within the angle of incidence of both weight and concussion, influences which it was never contemplated it should withstand, and which its structure precludes its sustaining without injury. The bone becomes first bruised and then diseased; the tendon, to which it was intended it should act as a pulley, which passes over and is in constant contact with it, before long also becomes implicated, and what is technically known as navicular arthritis is thus engendered and developed.

SHOEING FOR A SPECIFIC PURPOSE.

Thanks to the amount of attention which every detail that could possibly tend to the more perfect development of that paragon of horseflesh, the American trotter, has received at the hands of all classes of men, the matter of shoeing for specific purposes has made greater progress in America than in any other country on the face of the globe, and that is a department of the farrier's art which is justly entitled to the highest eulogium that can be bestowed upon it.

The different styles of shoes which have been devised are marvels of ingenuity, and many of them are admirably effective as remedial agents for faulty gaits and uneven action. Their number is infinite, but as many are applicable only, or in a large measure, to horses used solely for speed purposes, any attempt at classification or detailed description would be out of place in a work of this kind. When intelligently applied a considerable number are, however, potent auxiliaries in mitigating in some cases the results of natural defects of conformation amongst animals whose lot is cast in the humbler if more useful fields of horse enterprise. Among these are the scoop-toed or roller-motion shoe for the forefeet (Plate XXXXII, Fig. 2) and the shoe (Plate XXXXII, Fig. 3) for the hind feet, which, while they obviate "forging" or "clicking," a habit hurtful to the horse and singularly annoying to his driver, do not in anyway tend to inflict injury on the feet or limbs. The scooped or rolled toe confers a mechanical advantage, enabling the animal to get over his toes more promptly and thus remove the front foot from the stroke of the hind extremity, while the lengthening of the branches of the hind shoes, by increasing the ground surface, retards the flexion and extension of the hind limbs.

The common practice of increasing the weight of the outside web of the hind shoes, to open the action (Plate XXXXII, Fig. 4), is equally harmless and efficacious when not carried to extremes.

Plate XXXXIII, Fig. 1, is the most effective model of shoe to square and balance the gait of unmade horses, but the period of its use should be strictly limited and the weight of the toe gradually reduced as the desired gait becomes established. An ingenious shoe to prevent "dishing" or "paddling" is shown in Plate XXXXIII, Fig. 2, but I cannot acknowledge so implicit confidence in its efficacy, as the vice is the result of a physical malformation, which mechanical means can go but a small way to remove or palliate.

There are many other styles of shoe, the product of American ingenuity, for which probably equal merit might be claimed, but there are others, which, while they may cure or mitigate the special defect against which they are directed, only do so at the expense of some other portion of the structure. It has many a time furnished food for thought to the writer that in this great commonwealth, while there are such a large number of artificers who make horseshoeing a profession, who offer such convincing testimony of a vast amount of careful thought and patient

PLATE XXXXIII.

1. 2.

TOE WEIGHT SHOE. NON-PADDING SHOE.

study of at least some of the principles of their very important profession as many of these devices afford, the bulk of such work should be permitted to fall into the hands of a set of incompetent, ignorant, and ofttimes unprincipled bunglers, who prey upon the credulity of their employers and inflict upon the most generous of all our dumb servants an amount of injury which curtails the period of his usefulness and results in his premature decadence at an age when he ought still to be in his prime. It is possible, if not probable, that in the future it may become a less invidious task to discuss this much-vexed problem. In this age of marvelous ingenuity, is it visionary to hope that it is within the power of chemistry to develop some preparation which, applied to our horses' hoofs in a liquid or pultaceous form, will quickly harden into a substance closely resembling the natural horn, which will enable us to dispense altogether with the heavy, unyielding iron, and while it affords the necessary protection to the foot will permit it to retain to the full its wondrous combination of lightness, strength, and elasticity, and enable it to perform its varied functions under the most exacting conditions which advanced civilization can impose, with that marvelous trinity of apparently incompatible characteristics unhampered as they left the workshop of the Creator, all acting together in perfect harmony and absolute efficiency.

In the meantime it behooves us to make the most of the means within our power. Our horses are national property. Surely, therefore, it is time that the possibility of a great national economy was recognized, and some legislation formulated which would require an established standard of attainment in a class of workmen to whose care property of such value is habitually intrusted, and upon whose proficiency, or the reverse, so much of its utility or comparative worthlessness depends, while it, at the same time, provided for some means of practical instruction which contemplated raising the science of horseshoeing above the baneful influences of ignorance and traditional routine, to that position to which its importance to us as a people justly entitles it.

Metal Bank Notes.

Sir Henry Bessemer recommends the issue, for monetary purposes, of what may be styled a bank note made of metal. It would answer the purpose of the old tokens, but Sir Henry's main point is that, with the progress recorded of late years in the science of metallurgy, forgery and fraud would be impossible. He proposes that a thin plate of aluminum, suitably stamped and engraved, and about the size of a florin, should be used to serve the purpose which the £1 note was to fulfil. That is to say, it would represent the value of £1 sterling, and would be redeemable on presentation. Its intrinsic value would be small; but by means of a newly-invented process it could be so manufactured as to defy the ingenuity of the forger. The metal is so light that the alluminum token could never be mistaken for a silver coin; and it would be a much pleasanter thing to handle than a crumpled, dirty note, impregnated possibly with the germs of many diseases. The condition of a £1 note after it had passed a few hundred times through the hands and pockets of butchers, fishmongers, mechanics, and the general public can be imagined.—*St. James's Gazette.*

When the farmer discovers that the bread upon the table lacks salt, he should think at once of his cattle, which without this very necessary article will be poor in flesh and weak in milk.

HOG INOCULATION.

Results of the Practical Tests Applied to Dr. Billings's Alleged Discoveries.

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
WASHINGTON, D. C., March 5, 1892.

HON. J. M. RUSK, Secretary of Agriculture.

SIR: I have the honor to transmit herewith for your information a report of the recent experiment made in La Salle County, Ill., with a view to testing the value of inoculation as a preventive of hog cholera.

I have the honor to remain sir,
Yours, respectfully,
D. E. SALMON,
Chief of the Bureau of Animal Industry.

The experiment at Ottawa, Ill., to test the value of inoculation as a preventive for hog cholera has been concluded, and the facts in regard to it are now furnished for the information of the public. There has been great interest manifested by the swine-growers of all parts of the country in the results of this experiment, because it has been the first test under the direction of farmers that has been made with the necessary precautions to secure exact and reliable evidence on this subject. In this case great care was observed in arranging the details of the test, in selecting proper animals which had not been previously exposed to the disease, in locating the lots where the animals were to be kept, and in avoiding everything which would have a tendency to lessen the value of the experiment as a practical illustration of the results which may be expected to follow inoculation when performed according to the methods which have been most highly recommended.

This public test was proposed by Dr. Salmon, Chief of the United States Bureau of Animal Industry, to settle the controversy which had been started by Dr. Billings, of the Nebraska Experiment Station, in regard to the value of inoculation as a practical preventive of hog cholera. The Bureau of Animal Industry investigated inoculation very thoroughly early in 1886, and concluded that the advantages following its use were not sufficient to justify its recommendation for general adoption as a means of preventing swine disease. This conclusion has been confirmed by subsequent investigations, while the dangers and disadvantages of the method have been made more apparent by the attempts to utilize it in the Western States. On the other hand, Dr. Billings has asserted in the most positive language that his method of inoculation was a great success; that it was free from danger, and could be satisfactorily used by the farmers themselves after they had received his instructions.

The farmers of the country, and particularly those of La Salle County, Ill., were very much interested in the question and desired to see it thoroughly tested. Dr. Billings was at Ottawa on Nov. 7, and gave a free lecture to the farmers on the subject of inoculation. He killed an affected hog to show the farmers what kind of a subject to select to procure virus from, and how to prepare the virus for inoculation. He distinctly stated that the virus he then prepared was all right, and that it might be saved and used to inoculate hogs. After the lecture Dr. Salmon proposed a public test of inoculation to be made under the supervision of a committee of farmers, and invited Dr. Billings to inoculate one-third of the hogs, one-third to be inoculated by a representative of the Bureau, and the remaining third to be left without inoculation in order to determine which fared the best when exposed to the disease.

Dr. Billings declined to make any inoculations, but said that Mr. Cadwell, one of the farmers present, had received instructions from him and could inoculate as well as he could himself. It was understood at the time that Mr. Cadwell should inoculate with the virus which had been prepared by Dr. Billings at the lecture, but this the latter afterward declined to allow. Dr. Billings was then invited to furnish virus from his laboratory for inoculating these hogs. This he also declined to do. In a letter published in the Omaha *Bee* he said: "The reason I would not send virus from here was simply this: I am instructing farmers how to make their own, and am succeeding, and do it safely, for if inoculation is ever to become practical it must be a simple and cheap method." In other words, he asserts that the success of inoculation depends upon farmers being able to do it safely themselves, and, of course, if they are not successful in doing it themselves, then inoculation must, in his opinion, be a failure.

Mr. Cadwell, who was to make the inoculation by the Billings method, then prepared virus from animals selected by himself from diseased herds in the vicinity, and used this in making his inoculations. The following is the report of the committee having the experiment in charge:

A Proposition to Test Dr. Billings's Alleged Discoveries in Preventive Inoculation for Hog Cholera, and the Value of Inoculation in General for this Disease.

Sixty hogs, from four to six months old, shall be purchased and divided into three (3) lots, each hog to be marked with a numbered hog label in the ear—Mr. Cadwell to inoculate twenty (20) of these by his method; the Bureau of Animal Industry to inoculate twenty (20) of these by its method; to be inoculated once by each. The remaining animals to be kept separated from inoculated animals, without inoculation. Immediately after the inoculation the two inoculated lots shall be turned together, and they shall not again be separated except by consent of both parties to the experiment. The farmers now present will select the farm upon which to keep the animals, and designate five (5) unbiased farmers, who shall have charge of them, and who shall, at the end of the experiment, make a written statement as to what was done and what were the final results. Both parties shall be consulted as to the management of the animals, and particularly as to any changes in location, in feed, or in the care of the animals, and the report of the committee shall be confined to statements of facts; but the committee of farmers shall have the right to decide upon any disputed points in regard to these matters. One-half of the expenses for purchasing and keeping the hogs shall be paid by the farmers, and one-half shall be paid by Dr. Salmon. Inoculated and check hogs shall be turned together after 30 days, if possible, on a farm where cholera exists.

The following committee was appointed: Charles Eaton (Chairman), Vermillionville, Ill; A. E. Brunson, Northville, Ill; W. H. Watts, Ottawa, Ill; Harry Rockwood (Secretary), Ottawa, Ill; M. C. Hodgson, Ottawa, Ill.

The above proposition to test the value of inoculation as a preventive of hog cholera having been accepted, the farm of Charles L. Eaton, at Deer Park, La Salle County, Ill., was selected.

Fifty-five pigs were bought in localities free from hog cholera, and divided and inoculated as directed. The inoculations were made Nov. 28, 1891. The inoculated hogs were kept in a four-acre field, and the uninoculated hogs in a field the area of which is about three-fourths of an acre. One corner of the field in which the uninoculated hogs were kept was separated only 20 feet from the field in which the inoculated hogs were confined. The water for the hogs flowed from the end of a tile draining an adjoining field in which no hogs had been kept. This tile opened in the lower corner of the field in which the uninoculated hogs were kept, and then passed into an open ditch which flowed in a curve to the lower end of the field in which the inoculated hogs were confined. The hogs were fed corn in the ear, and also received some ashes and salt. No change of consequence was noticed during the first nine days after inoculation.

Dec. 7 two hogs were showing symptoms of disease, and Dec. 10 the first pig died. This death was followed by others, until now only 19 hogs remain. The dates upon which the hogs died are given below, together with the method by which they were inoculated, or with the name "check," signifying that they were not inoculated. The dates are as follows:

Died Dec. 10	1 hog,	Cadwell.
Died Dec. 12	1 hog,	Cadwell.
Died Dec. 13	2 hogs,	Cadwell.
Died Dec. 18	1 hog,	Cadwell.
Died Dec. 20	1 hog,	Cadwell.
Died Dec. 21	1 hog,	Bureau.
Died Dec. 24	1 hog,	Cadwell.
Died Dec. 25	1 hog,	Cadwell.
Died Dec. 26	1 hog,	Cadwell.
Died Dec. 28	1 hog,	Check.

Dec. 29.—At this point in the experiment—the 30 days having expired, the time during which the hogs should be separated—the checks and inoculated animals were turned together.

Died Dec. 31	1 hog,	Bureau.
Died Dec. 31	1 hog,	Cadwell.
Died Jan. 1, 1892	1 hog,	Bureau.
Died Jan. 2	1 hog,	Bureau.
Died Jan. 3	1 hog,	Bureau.
Died Jan. 4	2 hogs,	Checks.
Died Jan. 6	2 hogs,	Checks.
Died Jan. 7	1 hog,	Check.
Died Jan. 8	1 hog,	Check.
Died Jan. 10	1 hog,	Cadwell.
Died Jan. 10	1 hog,	Check.
Died Jan. 11	1 hog,	Check.
Died Jan. 13	(Missing—supposed to be dead) 1 hog,	Bureau.
Died Jan. 13	3 hogs,	Checks.
Died Jan. 17	1 hog,	Check.
Died Jan. 17	1 hog,	Cadwell.
Died Jan. 19	2 hogs,	Bureau.
Died Jan. 21	1 hog,	Check.
Died Jan. 23	1 hog,	Bureau.
Died Feb. 5	1 hog,	Bureau.

The condition of the remaining hogs is good, with the exception of three animals, and they will probably make a good recovery.

(Signed) CHARLES L. EATON.
H. E. ROCKWOOD.
A. E. BRUNSON.
WILLIAM H. WATTS.
M. C. HODGSON.

It should be noticed that the first hogs to show sickness were those inoculated by Mr. Cadwell, and that this sickness appeared in nine days, or about the usual time which elapses between exposure and the appearance of disease. This indicates that the disease was caused by Cadwell's inoculation. Fourteen more days passed, during which six Cadwell hogs died before the first one of the Bureau hogs died. This indicates very clearly that the Bureau hogs contracted the disease from exposure to the Cadwell hogs. There are here two facts plainly brought out, viz. (1), the Billings method of inoculation may cause an outbreak of the disease it is designed to prevent; (2), the disease thus caused is communicated to other animals in the same manner that ordinary outbreaks of the disease are communicated.

The uninoculated hogs were turned with the inoculated ones on Dec. 29. The object was no doubt to determine how many of these would die when exposed to this outbreak, and compare this number with that of the inoculated hogs which died. The final result of the experiment is that 14 of the 19 hogs not inoculated died; 12 of the 18 hogs inoculated by the Billings method died, and 10 of the 18 hogs inoculated by the Bureau died. The variation in the figures may be accidental, or it may show a slight degree of immunity conferred by the inoculation, particulary with the hogs inoculated by the Bureau, as one more of the Cadwell hogs and two Checks were very sick, while all of those remaining in the Bureau lot are in good health. Practically, it must be admitted, there was no great difference in the effect of the exposure on the three bunches of hogs.

In order to explain the production of the disease by Cadwell's inoculation, it has been stated by Dr. Billings and by editorials in certain papers, that Mr. Cadwell had written a letter in which he asserted that "after Dr. Billings had refused to supply him with virus he was unable to secure a hog suffering from a mild attack of cholera. He could only get virus from a malignant form of disease, so he told the committee in charge that he was not satisfied, but they told him to go ahead, and he did so, with the fatal results stated in the dispatch." (*Farmer's Review*, Dec. 23, 1891; also Nebraska *State Journal*, Dec. 27, 1891, and Jan. 22 and 29, 1892.) The Department has investigated this statement and is satisfied that it is not correct.

When it became apparent that Dr. Billings was endeavoring to delay this test and avoid responsibility for the results, Dr. Schroeder, who represented the Bureau, was instructed not to go on with the experiment if Mr. Cadwell objected to any of the arrangements. Accordingly, before beginning the inoculations, Dr. Schroeder asked Mr. Cadwell if he was fully prepared and satisfied to go ahead, and whether

he was perfectly satisfied with his virus. Both of these questions he answered in the affirmative. The following statement, signed by every member of the committee, confirms this statement, and shows that Mr. Cadwell, so far from being directed to use the virus against his wishes, acted strictly in accordance with his own judgment:

We, the committee of farmers appointed to superintend the experiment of inoculating hogs at the farm of Charles L. Eaton, in Deer Park Township, La Salle County, Ill., by Dr. Schroeder, representing the Bureau of Animal Industry of the Department of Agriculture, at Washington, D. C., and Mr. George C. Cadwell, representing the so-called Billings method of inoculation, do hereby state in regard to the report that we directed Mr. Cadwell to proceed with the inoculation on Nov. 28, 1891, against his judgment; that we did not direct Mr. Cadwell to proceed with the inoculation on that date, but that he used his own judgment in the matter.

Dated at Ottawa, this 1st day of February, 1892,

(Signed) CHARLES L. EATON.
H. E. ROCKWOOD.
A. E. BRUNSON.
M. C. HODGSON.
WILLIAM H. WATTS.

The facts appear to be that Mr. Cadwell had three flasks of virus, obtained from different sources, and he tried to get the committee to take the responsibility of saying which flask should be selected. This the committee very properly declined to do, since Cadwell had been instructed by Dr. Billings, and represented him in the experiment. As a matter of fact, Cadwell made use of two of his flasks, inoculating half of his lot of hogs from one and the remainder from the other. The disease was caused by the virus from both sources.

The objection urged against this virus by Dr. Billings is that it was obtained from an outbreak where more than 50 per cent. of the animals died. (Nebraska *State Journal* Jan. 29, 1892.) If this is to be the criterion in selecting the virus, it is obvious that no one can be certain as to whether or not he is using a proper virus. The virus must be obtained while the disease is in progress, whereas we can only know how many die from any given outbreak after the disease has ceased its ravages.

One flask of the virus used by Cadwell was obtained from the farm of Henry Richards, where 91 per cent. of the animals died. Of the hogs inoculated with this virus 88 per cent. died. The other flask was obtained from the farm of Nicholas Shawback. There were in this herd 146 hogs, of which 50 died, and one was killed by Cadwell to obtain virus. Eighty-three from this farm were sold apparently healthy, and 12 remained in good health at the time inquiry was made, about Feb. 15. As a matter of fact, therefore, but 34 per cent. of this herd died. Of the hogs inoculated with this virus four out of nine died, or 44 per cent. That is, in the latter case, the virus was more fatal in the inoculated animals than in the herd from which it was obtained, while in the former case there was practically no difference.

The first hog to die was one inoculated with the Richards virus. Two days later one inoculated with the Shawback virus died. The day following this, one died inoculated with the Richards virus and one with the Shawback. There can consequently be no doubt that the virus from both places produced fatal results.

As an illustration of the difficulty of obtaining proper virus and of the dangers attending inoculation, it may be added that according to Dr. Schroeder's reports Mr. Cadwell inoculated four hogs by the Billings method previous to the beginning of the test experiment. Of these two died. Shortly after the experimental hogs were inoculated, Cadwell inoculated five hogs by the Billings method. Of these three died. He also inoculated 14 hogs and pigs by the same method on the farm of James Mitchell, near Utica, Ill. No trouble was noticed among these until four or five weeks after inoculation, when the disease broke out and 10 animals, or 71 per cent., died.

It may also be stated in this connection that early in October, 1891, Mr. James Richey, of Tonica, La Salle County, Ill., obtained virus from the Chicago establishment organized by Dr. Billings, and at that time conducted by his former associate. Mr. Richey at once inoculated his herd of 90 animals, which were, in the words of the owner, "a first-class lot of young, healthy hogs." Nine days after the inoculation they commenced to die, and at the time of Dr. Schroeder's visit but two remained alive. The loss in this case was over 97 per cent.

This is the experience with the Billings method of inoculation in La Salle County, Ill., since Dr. Schroeder has been stationed in that locality. After a full consideration of the matter, Secretary Rusk desires to caution the farmers against the danger of introducing and spreading disease by the practice of inoculation. It is evident that the benefits of this method of prevention have been exaggerated, while the dangers and losses from it have been concealed or explained away.

The Department of Agriculture has endeavored to obtain the facts and place them fairly before the farmers, for it is these which should decide the question, and not the over-sanguine theories or the misrepresentations of interested parties.

CHINA.

A Great Nation Which Has No National Life.

To describe China's condition in the political terms of the West is a very difficult task, so inadequate are these terms to express the different phases of Oriental life. The government is patriarchial, and is sustained by the accumulated force of centuries of use and wont. The Emperor is (in theory) the father of the people; his subordinates are little fathers. The officials, high and low, are supposed to govern according to established customs and to a good code of laws founded on the precepts of Confucius. But there is no strong, national sentiment. The Empire is an aggregation of States, with few of the connecting links by which, in the multiform corporate life of the West, province is knit to province. China leads a sort of polypus life. The provinces are separated from each other by spoken languages, diverging from a common source as widely as do French, Italian, and Spanish; and of dialect so strongly pronounced as to make the speech of one district almost incomprehensible to another. The means of communication are slow and costly. There is no highly-vitalized energy throbbing from one end of the land to the other. The blood circulates very slowly through the corporate body. Strong clan jealousies and mutual distrust keep the people apart and force them to live a sectional, disjointed life.

The Chinese system of government lacks entirely the progressive and unifying element of popular election. The people have no voice in the choice of their rulers, and the rulers consider the people as so many sheep to be fleeced. The officials are paid starvingly low salaries, and many offices are openly bought. Corruption and extortion may, therefore, be said to be almost sanctioned, the only restraint being the dread of insurrection and the power of guilds, clans, and secret societies. There is imperfect protection from robbers and pirates, many villages preferring to subsidize robber bands rather than to have to deal with the worst form of robbery practiced by the officials.

TRAINING TROTTERS.

What they Need is Variety of Motion to Develop Their Muscles.

During a recent conversation with Trainer James Golden, he remarked that the method of training trotters would change greatly within a few years. They will be given much less track work in future than they have had in the past. Every one who has had experience in such matters knows that when a horse has been transported some distance by rail he will generally trot a much better race when taken right from the car than he would when put on board the train. The motion of the car causes the animal to continually change his position, and brings the muscles into play, exercising them just enough to render them supple and bring them into the best possible condition for enabling the animal to do his best. Now it is probable that someone will take a hint from this and invent some sort of an arrangement for giving trotters the same exercise in the stables that they get in the car during transportation on a railway train. This can be easily accomplished and will not be a very expensive matter. Years ago Trainer Wagner used to give his big trotting mare Phyllis swimming exercise, with very gratifying results. Other trainers took the hint from this, and have practiced Wagner's method with excellent success. It is stated upon apparently good authority that Williams practiced this with Allerton after it was thought that he was broken down in his three-year-old form, and that years ago Budd Doble kept the trotters Hotspur and Billy Bar in racing form by giving them swimming exercise. Budd Doble's experience antedates that of Wagner. The effort in swimming develops the muscles without soring them, and relieves the legs and feet from the strain and concussion imposed on them by fast road or track work, while at the same time it develops the lungs. It is also claimed that flesh can be reduced much more rapidly and with less danger of injury to the animal by giving them swimming exercise than by any other method of training known. A California horseman has built a large tank in a building and will give the experiment a thorough trial. If it proves satisfactory, others will follow his example. It is not improbable that the training-track stable of the near future will be provided with both a swimming tank and a device into which the animals can be put and subjected to the car-like motion, which often proves so beneficial when transported by train.—*American Horse Breeder.*

A Winter Study for Farmers.

MARYLAND WEATHER, 1889, '90.

		Mean annual temperature.	Maximum.	Month.	Minimum.	Month.	Precipitation.
		Deg.	Deg.		Deg.		In.
Baltimore,	1889	55.8	93.3	July.	13	Feb.	62.35
	1890	56.6	98	July.	12	March.	46.90
B. C. Springs,	1889	56.0	89	May, June, July, Aug.	11	Feb.	63.21
	1890	56.4	93	July.	13	March.	48.02
Cumberland,	1889	52.4	90	May.	0	Feb.	40.17
	1890	53·2	94	July.	3	March.	52.42
Frederick,	1889	54.1	90	June.	4	Feb.	51.83
	1890	56.1	97	July.	12	March.	44.52
Gaithersburg,	1889	49.6	.....	.....	.....	.....	.....
	1890	51.4	.....	.....	11	March.	.....
McDonogh,	1889	53.8	90	June.	1	Feb.	59.91
	1890	54.2	92	July.	9	March.	46.30
Woodstock,	1889	53.4	90	June.	.....	.....	49.30
	1890	.....	96	July.	10	March.	
Fallston,	1889	52.6	90	May.	1	Feb.	70.12
	1890	.....	.....	.....	7	March.	56.16
Emmittsburg,	1867	51.7	96	July.	2	Jan.	.....
	1868	50.6	104	July.	8	Feb.	.....
St. Inigoes,	1867	54.8	91	Sept.	10	Jan.	.....
		8 mos.					
	1868	45.1	.....	.....	10	Jan.	.....
		8 mos.					
	1869	50.7	.....	.....	15	March.	.....
		9 mos.					

The jellyfish hasn't any teeth, but uses himself just as if he were a piece of paper when he is hungry, getting his food and then wrapping himself about it.

THE CUP AND THE LIP.

Happiness, Though Long Deferred, Came at Last to Two Loving Hearts.

BY ADELE M. GARRIGUES.

BEAUTIFUL woman, not more than 30 years of age, stood under the branches of an elm that sheltered her home, looking into her lover's face—the face of a strong, true man that a woman might look into with confidence.

"Faithless woman," said the lover, John Denham, trying to banish from her sweet countenance the very expression that had first made it dear to him. "Can't believe in happiness? What have you been doing to-day?"

"I don't suppose," she said thoughtfully, "breaking up an old home is ever a very hilarious task. I've been packing in grave-like trunks and boxes the packable furnishings of the old rooms. Some will go to Sister Helen and some will go over the hill. I've not dismantled the sitting-room or kitchen. Mrs. Redman will do that after we are gone." After a short silence she added: "I'm happy, John, for I love and trust you perfectly; but happiness, you know, after such an experience as mine, can't be very boisterous."

John kissed the sweet, upturned brow and the sensitive mouth that had made this loving confession, and said: "Margaret, if there's any chance for your happiness in my love, in my heart, in my care, it is all yours, you know that, dear. It is your breaking up here that has made you blue. My work has been more to my taste. I've been over to the new house with the builders. Everything is all right there. Bridget has cleaned it up. I've had the yard raked off. and if the Redman's carry out your plan of moving your things over while we are away we can be at home as soon as we get back."

There was some further conversation about arrangements for the quiet wedding that was to take place at 10 o'clock the next morning.

"Come as early as 9, John," Margaret said as he rose to go.

"Yes. Are you alone here to-night?"

"Mollie will be here. I don't want other company. It will be the last quiet hour. In the morning Mrs. Barnes and Mrs. Redman will be over to set the table."

"Well, dear, I must go to that Council meeting, as I'm to be away the rest of the month. I wish I could spend the evening with you." And then with tender, loving words they separated.

With lingering step and head bowed in sweet reverie, Margaret walked to and fro under the trees until the chatter of childish voices roused her. Two little girls, looking in their pink dresses like rosebuds on the green lawn, came up the path carefully bearing a basket between them. It was a loaf of wedding cake imbedded in flowers. After some pleasant words with the little ones, the basket was given to Mollie. The sky was changing rapidly, and clouds that had given a golden glow half an hour earlier were now dark and threatening. Telling Mollie to attend to the windows in the upper part of the house, she seated herself at the window in the bare, deserted parlor, ready to close the shutter when she must do so. She was looking at the scene that has been familiar from her childhood, as she could look at it no more. She might see it again, but not as her home.

She thought over her life, her happy girlhood, her early marriage to Harry More; her bitter disappointment, his cruelty, desertion, and the long years during which she had waited and hoped that fate would yet be kind; that he would return, reform, and be the man her girlish fancy had pictured. Then she thought of the day on which her neighbor, Mrs. Redman, had brought her a Texas paper containing a notice of his death. How well she remembered her father's words that evening, and her mother's sweet, silent sympathy, and the evident relief they felt, but would not speak! They were gone now, and for three years her life had been a lonely one. Then came brighter days. John Denham loved her. She had always known John. There was no hidden past to his life. She trusted him entirely. She was a very happy woman. And the dear little home over the hill looked as fair as did Eden to Mother Eve.

The wind was rising rapidly. She feared it might be a stormy day after all. Then the tables must be spread indoors. The friends would come. They were old friends; she should have a happy wedding whatever the weather might be.

A sudden gust whirled the open shutter from her grasp. It was growing dark, but as she leaned far out to secure the fastening she saw a tall, shambling figure entering the gate. By fading day and lightning flash she watched his weary, shuffling step as he approached the door. When within three feet of the window a succession of revealing flashes lighted up every outline of the halting figure—every lineament of the ghastly, bloated face—every flutter of his shabby garments. She saw him as if by the light of another world; she did not know him; was absolutely certain that she had never seen him—had never seen any human being at all like him in all her life—and yet, great heavens! what ailed her heart? She could not breathe, she could not stir. Even when there was an uncertain knock at the door it seemed ages before she could move.

She had sent Mollie to Mrs. Redman's on an errand. Remembering that fact gave her power to move. She walked to the sitting-room, took a lamp from the table, placed it in the hall, and with white face and trembling fingers opened the door.

"Don't know me, eh?" said the revolting wreck of a man who confronted her.

"No, I don't know you." She afterward recalled her own words and the husky tones of her own voice as she answered him. "I don't know you, unless you are Harry More."

"Why the —— should you know me if I wasn't Harry More? I was afraid I'd be too late, but I met old Ginks down at the corners and he told me you wasn't married yet. Just in time to save you! Guess you'll believe in Providence now." He had not waited for an invitation to enter, but going as steadily as circumstances would permit to the sitting-room he seated himself, and looking wickedly at the woman's despairing face remarked: "Seems to me you don't look exactly happy. What's the row? I've had moving accidents by flood and field; want to hear about 'em?" There was no reply. His next query was more pertinent.

"Why in thunder don't you say something about supper?" She went to the kitchen. Mollie was just coming in.

"Mollie, poor girl, it rains, and you're wet, but go quickly right back to Mr. Redman's and ask him and Mrs. Redman to come over here. I'm in trouble, Molly." Molly saw that there was someone in the sitting-room, but waiting for no further light on the mystery she again went out into the storm.

When Margaret began to look around for something for her guest to eat, her eyes fell on the basket of wedding cake which the little girls had brought. She covered it from her sight as if it had been the face of a dear child whom death had taken. No time for grief now. She remembered that the monster in there was hungry, and hunger was a dangerous factor in some emergencies. She found some substantial food and hurried back to the sitting-room. The cold tea with which she furnished the hungry man was qualified by sundry contributions from a little bottle which he carried in a convenient pocket. Conversation languished, and before his supper was ended his head was in danger of contact with the plate of cold meat before him. Margaret spread a blanket and pillow on the floor near him, and then, with the same hand that had so recently rested in John Denham's loving grasp, she helped her guest to slide from his chair to the floor and watched him as with a few drunken mutterings he fell asleep.

Footsteps were approaching. A moment later and Mr. and Mrs. Redman, Molly, and Hiram Smith entered the kitchen. These two were left to their own speculations in the kitchen while Margaret led her own friends to the sitting-room. Pointing to the figure on the floor she said quietly, "My husband has returned."

If Harry More, in the flush of his innocent, ambitious youth, could have had a vision of himself as with dethroned reason and wrecked manhood he lay prostrate there, he would have fled from himself as from the evil one. It was hard for Mr. Redman to recognize in that drunken figure the handsome, reckless, young man of earlier years.

"Are you sure this is More?"

"Yes; I have talked with him, there can be no doubt; he is my husband." Mr. Redman sit starring down at the unconscious man and drumming on the table with his finger tips. It was an ugly affair. He had nothing to say as yet. His wife, equally dumb, sat looking into Margaret's white face, while hot tears were rolling unheeded down her own.

"How did he get here?" Mr. Redman asked. Margaret told the story of his appearance.

"Then, if he's been down to Gink's, the whole town will know that he's here."

"Yes."

"You don't want to live with him?"

"Live with him? never; it would be gross wickedness."

"He'll make you some trouble, I'm afraid, if you stay here."

"I must get away at once from him—from everybody." And Margaret dropped her head on the shoulder of her old friend and sobbed. "There's sister Helen," she said, raising her face and forcing herself to meet the situation. "I'll go to her. She lives in northern Michigan. I'll take the next train."

"I don't know but that's about the best thing you can do, Margie. I'm downright sorry for you, you know that, but I wish you could get away before that drunken idiot wakes up. The next train goes through at 5 in the morning. You can't get off on that, can ye?"

"She can, if it's best," his wife said. "Her trunks are all packed. There won't be much for her to do; but how shall we manage about the things? When that brute wakes up he'll own everything here, and won't let us touch a thing."

Mr. Redman did some more reflective drumming on the table, and then said: "I can manage him, if Margaret decides to go."

"I've decided, I must go; I'll get ready at once."

"Well, I guess that's about the best thing you can do. Now, wife, fly around and help her, and when her traps are fixed up, take her over to our house for a rest. I'll entertain this gentleman." He called Hiram out to the porch, held a short conference with him, and sent him flying across the fields as if he were possessor of the seven-league boots.

When Margaret, without one backward look at the dear little home, stepped

out upon the wet lawn, the moon was again sailing through clear, serene skies. The storm without had died away. The storm within raged silently. They met Hiram when they entered the road; he had hitched up the horses and was driving toward Margaret's cottage.

"What are you going to do, Hiram?" Mrs. Redman asked.

"I'm goin' to prepare unfurnished lodgin's for rent," he said quietly as he passed them.

When Mrs. Redman had persuaded Margaret to lie down for a few hours she went back to the deserted house. Mollie was packing dishes, Mr. Redman and Hiram were moving furniture, while the prostrate lord of the little mansion was having a somewhat troubled sleep. By 12 o'clock the house was empty and Hiram had driven away with Mollie beside him on the last load.

Mr. Redman's last care was to take from the pocket of the sleeping proprietor a pistol and a box of matches. Mrs. Redman kindly substituted a loaf of bread and a basin of cold coffee.

The first rays of the sun the next morning fell on the figures of two parties who, from opposite directions, were approaching the little station-house. From the village two men were walking rapidly up the road; one was talking hurriedly, earnestly, while the other looked dazed, bewildered, unbelieving. From the other side of the road Mrs. Redman and Margaret were approaching. The station-master unlocked the little sitting-room, John and Margaret passed in, and their old friends looked into each other's faces with futile tears of sympathy as they walked up and down the little platform.

John took her in his arms. Her white face, the deep lines that in a night had written their story there, told him that their separation was inevitable. She drew herself away from him with a movement that cut him to the heart. "Look, Margaret," he said, "there is the roof of our home, the home where you were to live with me!"

"John, I must not look, I must not think. I must leave you. We have been dreadfully mistaken. Oh, it is too hard!" The man at her side left her for a moment, walked the length of the little room; returning, he approached her with extended arms, saying, "Margaret, see here! Look at these muscles," showing his clenched fists, "see how I could work for you, fight for you! I have strength to uproot trees, remove mountains, and here I must stand and see you leave me with no power to take that wretched idiot out of your way." There was nothing to say. She bowed her head and wept.

"I will not let you go. I will go with you! May I, dear?" She could not speak. She shook her head. A power of which she was ignorant helped her to be strong; it was the power of habit, the habit of right doing. It bore her along now when the whirlwind of passion seemed overwhelming. The train was approaching. Mr. Redman opened the door—embraces, tears, and separation. The wheels began to turn and distance began to widen between two people who would gladly have sacrificed everything but honor for the right to live their lives together.

When Mr. Harry More awoke it was late on the day following his return. He was faint and sick; his bottle was empty; he drank from the basin of coffee; he could not eat. Slowly he arose and made an effort to recall the events of the preceding evening. "Got off the train at G——. Met old Ginks; talked things over; took a drink—talked some more—took another drink." He was on the right track, and in time arrived at a tolerably clear recollection of his interview with the woman he had presumed to call his wife.

"I asked for some supper, sat down to a table. Where's that table gone to? Where's everything gone to?" and staggering to the sitting-room door he looked around upon the empty rooms until bewilderment gave way to desolation. A mixture prepared by friend Ginks would have made a man of him, in his own estimation, but without it he had no strength with which to be vindictive. His limbs trembled so that he could not walk; he sank down on the little porch and—cried. No, my temperance friend, it was not a softened heart, only a softened brain that troubled him now.

He walked to a seat beneath the elms, the elms under which he had whispered his vows of love to Margaret. The coffee and fresh air were doing their best for him, but with strength came misery. What that hour of reflection was to him we can only judge by succeeding events. Bitter enough, doubtless.

"Ginks," he said, as again he stood before his old friend, "I've something to do before I can enjoy myself. I want a room where I can write. Just half a glass of brandy—no more."

"Yes, yes; sit down here, Harry, until wife gets a room fixed up. Pretty early in the morning, you know."

Harry may have had his prejudices against water as a beverage, but they did not prevent his setting some value on it for purposes of external application. He felt better after his bath. He could not eat, though he tried to do so. After the attempt he sat down and wrote rapidly, with nervous, trembling fingers, for an hour. This done, he folded his several sheets of manuscript into one plethoric package and addressed it. His task was done; he unlocked his door, and finding no one in the saloon he went deliberately behind the bar, poured himself a glass of brandy, filled his bottle, and returned to his room.

When Margaret had been one week with her sister in her little home among the Northern pines, the sudden death of the young girl who had taught the little district school seemed to point out her duty. With a heart aching from recent sorrow and present loneliness she seated herself among the little circle of boys and girls and tried to give her thoughts to the work she had accepted as their teacher. Again, the habit of doing the duty that lay nearest, aided by her love for children, helped her. Still the hours were long and the future dark.

When she had been teaching about a week, she sat alone in the plain, little room, after the children had been dismissed. She was thinking of the last evening under the elm with John, when she had left his arms, thinking that it was the last night of their life apart. She saw again the green fields, the spires of the village churches rising among the tree tops, the ruddy sunset glow reflected on the face that was dearer than life to her, and heard the strong, vibrant voice that promised her love, tenderness and rest; then she looked out of the schoolroom windows at the shanties of the little, bare, unpainted town, looked at the blackened trunks of trees that were waving their fire-stricken branches against a leaden sky. She shuddered, dropped her head upon her arms and sobbed in a pure abandonment to grief and loneliness.

During the long hours of the day in which she has been working and weeping, a certain train of cars has been making its way northward with what has seemed to one passenger but snail-like speed. He, too, has looked at the desolate, burnt forests and unpainted, wayside towns with the disgust that is overcome only by the practical logic of the business man. He has reached the station; he is making long strides up the road; he has knocked and inquired at a certain house; he has turned away; he is coming toward the little schoolhouse; he is knocking at the door; he has opened it, and his arms are again around her.

"Oh, John, if God is good, he will let us die now."

"Oh, no, he won't; he'll let us live. Look up, dear, and be happy. I've come to take you home, to our little home over the hill." And then, replying to the question she could not ask, he said: "Harry More died yesterday, dear; you owe his memory but little respect. Letters were found which make it certain that he has another family. Forget it all, darling. There is no reason in the wide world, now, why we should not make each other happy."

That evening there was a very quiet wedding in the best room of a certain house in M——, and the school directors of that little town were obliged to find another teacher for the village school.

Bay Rum.

Bay rum is manufactured in Dominica from the dried leaves of pimenta acris. Bay rum is procured by distillation, and this in a very simple manner. The leaves are picked from the trees and then dried; in this state they are placed in the retort, which is then filled with water and the process of distillation is carried on. The vapor is then condensed in the usual way and forms what is known as "bay oil," a very small quantity of which is required for each puncheon of rum. The manufacture of bay rum is carried on at the northern end of Dominica, and proves a very lucrative business to those engaged in it, as the plants are plentiful in this district.—*Garden and Forest.*

A German scientist has invented a method whereby petroleum and similar liquid hydro-carbons can be rendered non-explosive. This is accomplished by adding to the petroleum small quantities of a compound made up as follows: 92.81 per cent. chloride of sodium; 2.77 per cent. bi-carbonate of sodium; 1.84 per cent. sal ammoniac; 1.44 per cent. water; 22 per cent. sulphate of magnesia; 92 per cent. sulphate of lime, and 3 per cent. of analine. It is said that the use of this compound not only renders the oil non-explosive but makes it light more agreeable.

A bar of iron worth $5 worked into horseshoes is worth $10, made into needles is worth $350, made into penknife blades is worth $3,285, made into balance-springs of watches it is worth $250 000.

HOME TALKS.

Effects of Home Surroundings—Wives Should Be Consulted in Building Houses.

EDITOR AMERICAN FARMER: Some one has said "the life of the world is founded on the home." No one who has observed closely will deny the fact that the environment of youth colors all the after life. I do not say that a person never rises above or sinks below the life of their childhood, but I do say that they can never entirely escape from its influence.

Robert Collier says: "Good homes are like good apple trees—they propagate after their kind. What you see in New England in one era you see in Minnesota in another. When we make a home our children will have to think of in 40 years we make what they will have then made out of loving memories. If things go harder with some of the children than with us and they never realize such a home, still what we give them will bless them all their days."

This is true of the outer appearance and the inner life of the home.

If children grow up in an atmosphere of fault-finding, if parents are constantly disagreeing and bickering, the children will be cross and unpleasant to each other, and finally, in most cases, go forth to found just such homes for themselves.

On the other hand, if a patient, loving, cheerful spirit pervades the household, if father and mother always have a pleasant manner and kindly words for each other, the children will never be content with a home less pleasant, but will strive after the same blended domestic life which made their childhood's home so dear.

CONVENIENT HOUSES.

I have often wondered why we do not have more women architects. A woman would at least be able to plan our houses so they would be more convenient, and I do not believe they would lose anything in grace and beauty. Many husbands plan their houses to suit themselves, or allow the builder to furnish plans, without consulting the one who must spend the greater part of her life in the house, and must certainly be most interested in its arrangement.

If a woman should attempt to dictate about the arrangement of the barn or granary she would be quickly, and justly, informed that she was out of her sphere.

Now, why ought she not be given the same freedom in planning the house that her husband claims for himself in the barn?

I have in mind now a farmhouse, planned by a man, where the cookstove is at one end of a long, narrow kitchen, and the pantry door, sink and cistern pump are at the other end of the room. The cellar and woodshed can only be reached by going through the dining-room.

Just think of the miles of travel necessitated by this arrangement which, by careful planning, might have been saved. The pantry could just as well have been put at the other end of the kitchen in the place of the little bedroom that was there; then, the door leading to the cellar might have opened out of the pantry, and another door could have opened from this pantry into the dining-room. If the woodhouse had been built a few feet farther to the north a door from the kitchen could have opened into it, and nothing but lack of thought prevented the pump and sink being placed near the stove.

Aside from water in the house, I know of no contrivance more convenient than a wood-box built in the wall, between the wood-house and the kitchen, which may be filled from the outside, and do away with all carrying of wood through the kitchen.

A dumb-waiter, from the pantry to the cellar, is not an expensive convenience, and will save many steps to weary feet. If possible, have a dining-room where the table may be kept set, as that saves a great deal of work. It is best if it can be arranged so that there will be no necessity of passing through the dining-room to reach any other part of the house. Let the sleeping-rooms be as large and airy as possible, and the family living-room be the pleasantest room in the house.

Make the new house as neat and pretty as may be, but above all else make it convenient if you would find in it the true comfort of a home.—MRS. M. MCL. KING.

GOOD BREAD.

Homely Thoughts for Thoughtful Women.

EDITOR AMERICAN FARMER: A law among the Arabs permits a man to divorce any of his wives who do not make good bread.

Notwithstanding the barbarous seeming of such a law, there is in it a basis of justice. Should a man be all his life in jeopardy, having a defective staff to lean upon? Since bread is the acknowledged staff of life, it might well be better that he should part from the wife who fails to contribute this element of good living than to spend his days in misery, or bring them to an untimely end.

We who assume the government of a household take with it responsibilities as to the general welfare of its members, which are sometimes held too lightly. One of the chief of these is, that they shall be properly fed; and yet, while most housekeepers are peculiarly sensitive on this point, few give it intelligent and careful attention. Though the provision may be generous, there is too often a careless disregard in the selection, as well as in the preparation, of the food placed upon the table for every-day use. Good bread is the exception rather than the rule. Servants who cannot be expected to take a personal interest in results beyond securing their wages, and who as a rule in these days are not up to any respectable standard of efficiency, are intrusted with this department of household duties as they are in no other, and if they succeed to the point of toleration we submit rather than risk a trial of our own skill in that line. It is, perhaps, charitable to attribute this to a consciousness of our inefficiency rather than that we are too indolent to give personal service in order to establish the point of wholesome and agreeable food for the family.

It is seldom, however, that indolence can be charged against the country housekeeper; the nature of her duties there is such that she is almost driven into keeping pace with them when she does not voluntarily take the lead. There are no such makeshifts as baker's bread and green-grocer's supplies to resort to in her case. The stern realities of eating and drinking must be met, even if she has to resort to the hen-roost or go into the potato-patch for supplies. Nevertheless, being a wise woman, she will keep an eye upon the flour barrel and make the family loaf the pride of her heart.

The fact that our supplies are limited as to variety either brings all our wits into play to make provision for the family table year in and year out, or it makes us indifferent, and we cease to have any ambition to excel in that direction; the latter a most deplorable alternative, inasmuch as neglect to provide the best in our power for purposes so directly bearing upon health and strength gradually undermines both.

No housekeeper with a proper regard for her office can be indifferent to the quality of the food upon her table, and especially should she be concerned about the bread. While bread, if perfect, will hide a multitude of defects in other things, nothing else can cover the shortcomings of bad bread. It is the most unerring test of housekeeping, since they who, by painstaking, such as it requires, invariably provide good bread, will be quite sure to put the same energy and care into other departments; and the result is good housekeeping, good bread, good digestion, and good temper form a natural sequence, creditable to any housekeeper.

Bread assumes many forms in these days of manifold preparations for lightening and rendering the process easy, which have had much the same effect as the sewing machine, lessening the seeming importance of the original art. There remains, however, in its pristine glory, the good old-fashioned domestic loaf of bread, light, sweet; the result of home-brewed yeast, good flour, milk and water, and unstinted working, and which comes from the oven a thing of beauty and a joy as long as there is a crumb left; it is such bread as this that should be the ambition of all housekeepers. It would be well for the coming housekeepers if they were required to produce such evidence of their fitness before a marriage license was granted. Might it not also be an insurance of the nuptial knot?—Mrs. A. M. STEIGER.

ST. JANUARIUS.

The Liquefaction of His Blood the Great Event of the Year in Naples.

It is in the fervor of their religious professions that the Neapolitans differ most remarkably from us of the North, and even from the Lombard Italians. They are really as much Pagan as Christian, although the 20th century Anno Domini is so near its beginning. In the various scenes of the liquefaction of the blood of St. Januarius, for example, one learns well how Asiatic a religion is the Christianity of Naples. A group of priests, of all ranks, in crimson and purple and green and gold, parade the streets. Scores of massive silver busts of saints and martyrs precede the priests, strung with jewels and with burning tapers before them, each borne on a scaffold supported by six men in robes of crimson, or purple, or green, or gray. Confraternities, in garments white or blue or scarlet, accompany the busts. Soldiers also are in attendance. There is singing and incense burning. When the silver-gilt head of St. Januarius himself (in the procession with the rest) enters the church in which the miracle is to be wrought, a fanfare of trumpets, a burst of the organ, and choir of voices hail it from the galleries. The common people criticise and joke about the procession until St. Januarius appears, and then, if there is room, fall upon their knees and utter the petitions nearest and dearest in their hearts. The barren ask for babies, the girls for husbands, the poor for a lucky trio of numbers to play upon, and the old and suffering for speedy promotion to Paradise. Meanwhile, perchance, the bearers, who stagger under the weight of St. Januarius's silver self, curse each other for not going more slowly or more quickly, for the indiscriminate treading upon toes, or because of the unfair way in which the burden is divided among them. Later, when the Archbishop at the altar holds up the crystal vial of blood for the populace to see:

"Yes, it is certainly quite hard!" the people echo. The ritual of prayers to the saint is begun, and periodically the blood is uplifted to the candle, that its progress or tardiness in liquefaction may be observed.

"Oh, make haste, 'San Gennaro'! make haste!" cry the mob by the altar, for it is traditional that Naples and her children will in the coming six months have good fortune if the blood melt briskly, and the contrary if it be a work of time. It may be an hour, or it may be two or three hours ere the miracle is accomplished. In the latter case the mob by the altar will, ere its fulfillment, have become blasphemous.

"Oh, you dog of a yellow face!" they scream, "make haste!"

The Archbishop all the while turns the vial from side to side and up and down. If the wonder be achieved in the average time, contentment will prevail. Bishops in purple and begging friars with bare, dirty feet, millionaire merchants and itinerant chestnut-sellers, congratulate each other in a breath, watch in hand (if they have watches to hold).

"One hour and five minutes," says one.

"And six," suggests another.

"No matter to a minute or two," observes a philosophical third. "The miracle has been well done—praised be the Madonna and St. Januarius!"

Then the Archbishop and the sacred vial are hustled out of the church by the energy of the delighted populace, who contend to kiss the jeweled hand of the one and the crystal case of the other. The evening closes with fireworks and a display of electric light.

Rich Old Person—What do you want a wife for, when you can hardly support yourself? Why, sir, my daughter would starve!

Snookins (with great dignity)—Well, sir, if you are the kind of man to let your daughter and her husband starve, I don't wish to enter the family.

THE AMERICAN FARMER.

"O fortunatos nimium sua si bona norint agricolas."—VIRG.

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THE CAMPAIGN AGAINST WOOL.

The warfare against protection for wool was formally opened in the House of Representatives Wednesday, March 9, by Mr. McMillin, of Tennessee, who inflicted on that body a warmed-over campaign speech, which had been previously made to do hard duty on the stump in the gentleman's district. It contained the same extravagant misstatements and systematic perversions of facts which are the stock in trade of those who attack the sheep-raising industry, and endeavor to prejudice the people of the country against a just and judicious protection of the farmers' interests. These misstatements and perversions did not fail to be sharply challenged on the floor of the House, and these challenges were so successful as to leave Mr. McMillin without an answer. For example, when he asserted that some articles of knit goods were taxed as high as 323 per cent., Representative Walker, of Massachusetts, challenged him to specify a single article, and Mr. McMillin, though reiterating the assertion, was unable to do so.

Again, when he said that "Port Phillip fleece wool, which corresponds with Ohio medium wools, has borne substantially the same price in London that the Ohio wool has borne in Boston," Representative Burrows, of Michigan, immediately answered, and supported his answer by documentary evidence, that the Port Phillip fleece is a skirted wool, with all the inferior parts removed, and, therefore, naturally worth from six to eight cents a pound more than the same grade of non-skirted Ohio wools. Mr. McMillin wriggled for some time upon this sharp point, but was unable to escape from it.

Mr. McMillin and those who followed him were conspicuously inconsistent in insisting at one moment that the protective duties were a robbery of the people in compelling them to pay high prices for woolen goods, and in the next protesting with equal earnestness that they did not do the farmer any good, since the price of wool is constantly falling, and the number of sheep decreasing. They did not seem to see or care to see that if one of these things were true the other could not be—the two utterly contradicted each other.

He was equally unfortunate in his showing that the high price of wool deteriorated the quality of cloth in encouraging the use of shoddy, mungo, etc. If this were true, then the proper remedy would not be to abolish the duties on wool, but to raise those on shoddy, mungo, etc., so as to keep them out of the country.

As there are but four or five pounds of wool in a suit of clothes, and the average duty on wool is but 11 cents a pound, it is difficult for a plain man to see where, admitting that the duty is a tax on the consumer, there should be anything like the burden laid upon clothes-buyers that he claimed there is.

Representative Stevens, of Massachusetts, followed in a tirade against protected wool from the wool-manufacturers' standpoint. He reasoned himself into a logical hole by claiming that to take the duty off wool would save the people of this country $190,000,000 a year. Of course it would do nothing of the kind, but assuming that this was true, the next question would be: Who would lose this $190,000,000? It must be by the reduction of the revenues of the sheep-raisers of the United States. There is absolutely no other place for the money to come from. Foreign wool-growers are not going to sell their fleeces cheaper because we take off the duty. Now, there are, in round numbers, 43,000,000 sheep in the United States. A reduction of $190,000,000 would therefore mean that there would be an average reduction of about $4.50 on the price received for the fleece of every sheep. This would make a gloomy outlook indeed for the sheep-raisers of the country. They would not only get nothing at all for their fleeces, but would have to pay the country liberally for the privilege of raising sheep.

The fallacies of the free-wool advocates were thoroughly exposed in an admirable speech by Representative Dingley, of Maine, who showed himself thoroughly conversant with every feature of the problem, and more than answered every question thrust at him by the free-wool advocates. We shall have more to say of his speech hereafter.

IF, as the free-wool advocates claim, wool will be just as high with the duty taken off, how will the removal of the duty benefit the clothing and carpet buyers? Again, how will it benefit the manufacturers, if they have to pay just as much for their wool as they do now? The free woolites constantly entangle themselves in a mesh of self-contradictions.

NEW WORK FOR THE DEPARTMENT OF AGRICULTURE.

The Department of Agriculture is already of the highest usefulness to the people of the country, and many new channels are developing for increasing its benefits. Some of the suggestions in this direction are so novel as to require careful study as to whether they can be adopted with propriety. For example, Secretary Rusk received the following letter last week from a farmer in the West, to whom the Department last year sent some seeds of a highly-praised variety of cucumber, and who stated in the beginning that his wife died in consequence of eating the fruit thereof:

Your blamed cucumbers robbed me of my wife, so instead of sending me cucumber seed this Spring send me another wife. I hear there are a number of likely women in your Department.

Now, as the preachers and lawyers say, this raises several very important questions. The first is the scientific one as to whether the man himself ate of the same cucumbers that his wife did, and if so, how he escaped hale and hearty, while his wife died? Is it possible that there is a species of cucumbers which operates fatally on the female economy, but is healthful and pleasant to the "male sect," as Mrs. Partington would say? If this is so, the Department should know it at once, so that the seeds can be kept out of the hands of bad husbands, who may want to get a new wife without the trouble and expense of a divorce. Again, if this be so, the Department should at once make every effort to counterbalance its baleful effect by discovering some other fruit which will produce fatal gripes in the men-folks, and be entirely wholesome to the "better-half of creation." In this day of Woman's Rights we cannot afford to have the Agricultural Department scattering literally seeds of death to women, and letting the men go unscathed. Forbid it, Susan B. Anthony!

The next question is as to how far the Department is obligated to make good any damage that may result from the discharge of its functions as a seed distributor. The Western farmer says that having killed his wife it should supply him with another. Admitting this to be true, if the product of the seeds sent out had made her very corpulent, would he therefore have a claim on the Department for a sufficient number of bottles of anti-fat to reduce her to her former willowy proportions? Or, if she had broken her teeth on some of the nuts furnished by the Department, would it be liable for her dentist's bill? These be grave questions and not to be treated lightly.

Again, he says that the Department should supply him with another wife. What kind of a wife? The general opinion is that wives range in value far beyond anything else in the market. Some are as nearly worthless as any created thing can be—though we gallantly insist that the proportion of these is very small. Others, and by far the largest proportion, are absolutely pearls without price. The Western farmer does not say to which of these classes his cucumber-slain helpmeet belonged. From the moderate grief he expresses over her loss, he does not seem to have rated her very highly. Possibly, he would be satisfied with any fair-to-middling successor. On the other hand, he may want as a new wife one that will be a vast improvement on the old, just as a man whose house has been burned down, naturally wants the insurance company to build for him a model residence. If the case was reversed, and a widow were seeking a new husband, we should be sure that this would be the case. The women—bless their souls—always seem to value a man after his death the more highly the more worthless he was in life, and husbands whose lives were long inflictions on those around them become transmuted by sorrowing affection into the noblest of men.

The Secretary replied to the Western farmer that he did not consider the picking out of suitable partners for bereaved husbands to be within the legitimate scope of his duties; but he admitted that he had in his Department an extensive assortment of the softer and sweeter sex, which included "some beautiful maidens, many sprightly widows, and a number of well-seasoned old maids."

We will say to men residing in the womanless sections of the Far West, that not only in the Agricultural Department but in all the other Departments, and outside of them in the city of Washington, are great numbers of women, of all ages, colors, and previous and present social conditions, who would make the best possible wives, and it would be a great blessing if they could be transferred to good homes, where they would make deserving men and themselves much happier than either side is now.

It is to be regretted that the legal limitations of the Agricultural Department functions do not admit of its being made the medium by which the surplus women of Washington can be given husbands and homes, where women are only too scarce.

NEW FEATURES.

We have introduced a number of new features into THE AMERICAN FARMER, and propose to introduce a great many more. We do not intend to rest from our efforts until we have made THE AMERICAN FARMER the very best agricultural paper in the whole world. The farmers of the United States deserve the very best paper that the progress and the wisdom of the day can furnish, and we are going to make every effort to give it to them. We want all our readers to write us freely as to what they like or dislike in the paper, and we will welcome every criticism, suggestion, or commendation coming from them.

THE PURE FOOD BILL.

After a stormy experience in the sea of amendments and amendments to the amendments, Senator Paddock's Pure Food Bill has at last passed the Senate. It provides that there shall be organized a "Food Section" of the Agricultural Department, the duty of which shall be to analyze samples of drugs or food manufactured in any State or Territory and sent to another or abroad for sale. It prohibits the introduction or sale of adulterated or misbranded goods into States or Territories than those in which they have been made, under a fine of $200 for the first and $300 for each subsequent offense.

Articles of food or drugs that do not contain any poisonous ingredient shall not be deemed to be adulterated in the case of mixture or compounds under distinctive names; or in the case of articles labeled, branded, or tagged so as to indicate plainly that they are mixtures, compounds, combinations, or blends; or when any matter is added, so as to fit the article for carriage or consumption, and not to increase its bulk fraudulently or to conceal its inferior quality; or where the food or drug is unavoidably mixed with some extraneous matter in the process of collection or preparation.

Ask all your neighbors to subscribe for THE AMERICAN FARMER.

SENATOR PEFFER has introduced a bill to provide an Experiment Station to investigate and determine the applicability of electricity as a motor for farm machinery. Such a station would be of value, of course, but we think that there should be first an investigation of the applicability of wind as a farm motor. There is nothing that would relieve farm drudgery so much as an effective apparatus to utilize the power of the wind to do a wide range of hard labor on the farm which now requires the muscles of men, women, and horses. Even if a good method of applying electricity to farm operations could be discovered, there would be an immense number of farmers who could not avail themselves of it. The electrical current would have to be supplied by water power, or from some large central plant, and neither of these sources would be available to most farmers. On the other hand, every farm has a plentiful supply of wind during a great part of the year, and if a machine could be devised for storing this power up, so that it could be used as wanted, it would be the greatest boon to the farmers that the inventive genius of the age could give them. We suggest to Senator Peffer that he put through a bill offering a big cash prize to an inventor who will devise such a machine.

Get up a Club for THE AMERICAN FARMER.

IMPORTANT ARTICLES.

This issue of THE AMERICAN FARMER contains some articles of unusual importance to farmers. Prof. H. W. Wiley's contribution on "Progressive Agriculture" gives absolutely the latest thought and discovery in the science of agriculture. The article on "Horseshoeing" is by a Veterinarian who is acknowledged to stand at the head of his profession, and it states the latest and best facts in relation to the art of horseshoeing.

The article on "Swine Inoculation" presents in an authoritative form the results of the practical tests of the alleged discoveries in treating the swine plague. Both these articles are given to our readers by the courtesy of the Agricultural Department, and THE AMERICAN FARMER is the first paper to present them to the public. The information they contain is alone worth many times the price of the journal.

Walter Maxwell, of the Agricultural Department, and an expert in Sugar-Beet Culture, continues his series of practical articles on that topic of growing interest. What he says can be relied on as the best obtainable information on the subject.

Frank G. Carpenter, the noted correspondent and observer, gives a chatty article on the way our Far-East brothers—the Japanese—raise their great staple, rice.

Mrs. Adele M. Garrigues contributes a charming love story which will entertain everybody.

Miss Emily S. Bouton—who has a National reputation as a writer in her special province—gives a Household Department which will be of special interest to all farmers' wives and daughters.

Altogether, this issue of THE AMERICAN FARMER will be found of the greatest interest and value to every farmer's home, and we ask a critical examination of every part of the journal.

Good as it is, we propose to improve it with every issue, and shall spare nothing to make it *the very best farming paper published.* The farmers of the United States and their families deserve the very best farming paper that can be produced, and we are going to try to give them one that will gain their highest praise.

FRENCH Statesmen express themselves as certain that an International Monetary Conference will not accomplish anything. They regard the free silver agitation in the United States as the work of rich silver miners who want to enhance the value of the product of their mines at the expense of the public, and think that an International Conference would be merely an effort of this country to entrap those of Europe into a scheme to make them the dumping ground of surplus American silver.

WRITE TO US.

We hope that every farmer, farmer's wife, son, and daughter who reads this paper will feel impelled to write us something that may occur to him or her that others would like to know. We want to make THE AMERICAN FARMER the organ of the plain, practical people who conduct the millions of homesteads in every part of the country, and to be their medium of communication with one another. Each can help the other amazingly with ideas and suggestions, and in this way the paper will be the means of doing an immense amount of good.

MR. J. A. MCOSKEY, of Sumner County, Kan., must feel lonely among such busy, thrifty people as have made Kansas a great State in a few years. He is a large, healthy, able-bodied man, who would appear to advantage in a harvest field, were it not that he has a rooted aversion to doing any work between meals. Seven years ago he tried hard to provide himself with subsistence by marrying a capable, energetic woman. She supported him in comfort for two years, and then threw up the job. He has entered suit against her, claiming that she has "disregarded the solemnity of her marriage vows, and without cause deserted and abandoned him, and continues to live separate and apart from him, against his wish and consent." He sought to avoid the payment of the necessary fees by taking the oath which the laws provide where a complainant is without means to bring a suit, but the Judge has interfered, and Mr. McOskey, if he gets the papers filed, will have to do at least enough work to get sufficient money to pay the preliminary fees. He seems to have drifted into the wrong country. His proper home is one of the South Sea islands, where he can lie under a banana tree all day, and pick his breakfast, dinner, and supper from the branches above him.

ONE of the most difficult logical tricks ever attempted is the effort of free-wool advocates to make the farmer believe that taking the duty off wool will give the manufacturer wool at 11 cents a pound less than its present price, and yet give the farmer 11 cents a pound more for his wool than the manufacturers can buy the same grade for in South America or Australia.

THE terms of the monetary agreement among the members of the Latin Union—France, Belgium, Switzerland, and Italy—are that each Nation shall be allowed to coin silver to the extent of six francs ($1.20) per inhabitant, and such coins shall be received as legal tender in all those countries.

THE AMERICAN FARMER *is only $1 a year.*

A SPECIAL OFFER.

The American Farmer for the Rest of 1892 for 50 Cents.

In order to extend the circulation of THE AMERICAN FARMER and give a great number of people a chance to become acquainted with its many good points, we will make a special offer: *We will send the paper from now until Dec. 15, 1892, for 50 cents.* This is a splendid opportunity to get a vast amount of the very best reading matter for a very small sum. Do not fail to embrace it.

Address
THE AMERICAN FARMER,
1729 New York Ave., Washington, D. C.

A CANVAS of the peach-growers of the Maryland and Delaware belt shows a discouraging outlook. Nowhere will there be more than half a crop, while generally it is estimated at one-quarter. All the buds on the lower limbs are gone, and a large portion of those on the upper ones. This result is clearly not the result of over-fruiting last year, since the trees which bore the biggest crops then show most promise now. Nor, some hold, was the weather to blame, because the Winter was not severe. They attribute it to the improper maturing of last year's growth of new wood, from which most of this year's peaches must be obtained. The Smock and Troth varieties show most promise. Crawford's (Early and Late), Moore's Favorite, Old Mixon, Stump's, Reeve's, Mountain Rose, and fine varieties generally, make a very poor showing, with but from one-fifth to one-third of the buds alive on the four and five-year old trees, to none at all on the older.

SAMPLE COPIES.

We shall be glad to send sample copies of THE AMERICAN FARMER to any address that may be furnished. Those who wish to see the paper, or who want their friends to see it, will confer a favor on us by sending in requests for specimen copies, to be sent to any address they furnish.

Address all communications to
THE AMERICAN FARMER,
1729 New York Avenue,
Washington, D. C.

RAISE CLUBS.

We want every one to try to raise clubs for THE AMERICAN FARMER. It is a splendid journal, and will find favor in the eyes of all who see it. It ought to be very easy work to get subscribers. We will make good inducements for sons and daughters of farmers to get up clubs. Write for terms to club-raisers, and premium lists.

"Much Improved."

THE AMERICAN FARMER, formerly published in Baltimore, is being much improved by its new owners, who desire to make it the best paper of its kind in this country.—*American Union, Denton, Md.*

SUGAR-BEET CULTURE.

The Soil, Climate, and Methods Best Calculated for Success.

BY WALTER MAXWELL, DEPARTMENT OF AGRICULTURE

II.

WE ARE rapidly approaching the opening period of the sugar-beet culture season. When the frost is out of the ground and the soil is in a state for moving the preliminary operations of cultivation should at once be entered upon. The land intended for beets should be in condition for planting by the middle of April, if the weather will allow, If the season is normal, in respect of the general climatic conditions. the first planting should commence as early as possible after April 15, from which date up to May 15 are included the weeks during which the whole of the planting should practically be done. In view of the nearness of the time for the actual commencement of sugar-beet work in the field, we shall do well to give our attention at once to the subject, and in such detail as will guarantee our being in readiness for the first act of cultivation.

In a previous article which was devoted to a survey of the subject of sugar-beet culture in general, we endeavored to lay down the broad principles and lines of operation which underlay and control the culture of the beet. It will now be necessary to consider each period of the cultural season with more care and detail, adding to the observations in our previous paper such further illustrations as each stage of the work may demand.

Supposing that the land is being selected for the growing of beets where those roots have not been grown before, which is generally the case in this country, beet-culture being practically a new departure in our system of agriculture, there is a wide scope for selection, and the best opportunity for fixing upon those plats or tracts of ground which combine the main points of suitability.

Where the climate is in general agreement with the most favorable climatic conditions, and free from the great extremes of rain, drouth, low and high temperatures, and sunless skies, with much fog, which were enlarged upon in the previous article, the choice of the ground for the beet crop is then depending upon the so-called "lay of the land," the nature of the soil, its condition and previous cropping.

If it is possible, select the field or plat to be planted with beets upon practically level ground. On level ground the nature and depth of the soil does not so greatly vary. It is particularly desirable to have the land level where heavy rains and strong winds may prevail, as the small plants may either be washed out or blown out of the ground. If the land is not quite level, the slope should be chosen lying toward the sun, so that the maximum of heat and light is secured and the crop protected from the northerly winds. The same soil, with a south exposure and open to the sun, will be ready for planting a week or 10 days earlier than the north side of the hill, and the beets will be more secure from the early frosts in the Fall; thus making the season about three weeks longer. In great valleys where large tracts of beets are grown, the side sloping away from the northern hill boundary and which is fully exposed to the sun is always to be preferred.

In considering the mechanical nature of the soil to be chosen, we have to avoid the very light sands, heavy and tenacious clays, and wet, bog soils, which are full of organic matter. Excluding those extremes, almost all other soils are or may be made adapted to the purpose. Where it is possible, however, select the soil of a sand-loam nature, with a deep staple and a porous subsoil. Where the choice of the soil is regulated by a consideration of its chemical composition, the chief respect must be given to the amounts of lime, potash, phosphorus, and nitrogen that are present. The consideration of those soil constituents will be further noticed in remarks upon fertilizers. It is found that soils which grow corn and potatoes will grow beets; but we know that some soils grow much better potatoes and corn than others, and the same is found also with beets. Each beet-grower has to use his special judgment in the main, proceeding upon the broad principles laid down.

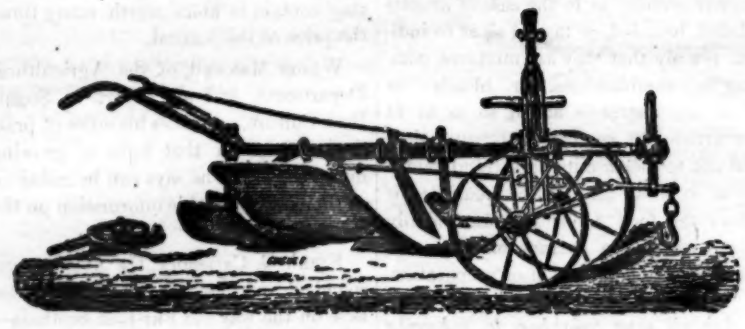
The land which has been in the preceding year cropped with grain, corn, and potatoes, or such leguminous plants as peas, should be in a suitable state for growing beets. New soils, such as prairie and woodlands, are not to be advised. They contain too large an amount of undecayed vegetable matter, which causes the growth of large beets but prevents the formation of sugar. Where possible, new, crude soils must be avoided, and only planted with beets after they have been cropped in grain or corn one, two, or more years.

Concerning the first acts of cultivation of the ground for beets, sufficient was stated in the first article to explain the extreme advantages of Fall plowing. Land which was plowed and subsoiled in the Fall should not be touched until the actual time for putting in the seed. The cultivation that is required for making such ground ready to receive the seed is so small in amount and so quickly accomplished that it should only be done immediately before planting. We have to think of Spring plowing, subsoiling, and general cultivation, because the value, the supreme value, of the Fall preparation of the soil for Spring planting does not appear to be yet in general acceptation.

Spring plowing should commence as soon as the frost is out and the soil is dry and firm enough to bear the horses without "setting." If the land chosen has been previously planted in corn or grain, and considerable rubbish and weeds are left, those should all be removed before the actual plowing is done. All cornstalks should be raked up and burnt, and the roots plowed out and hauled off. No good and economical cultivation can be done if such things as cornstalks or roots are left in the ground. They will be in the way all the season of every act of cultivation.

The plowing is done with a common plow. The depth is regulated by the nature of the soil and its previous cultivation. If the soil is rather shallow, eight inches is deep enough for the plow; and the subsoiler, going along the same furrow,

SUBSOIL PLOW.



SUBSOIL PLOW, ATTACHED TO PLOW.

loosens the soil, without turning it over, six inches more; so that a depth of 14 inches is reached. Where the soil is a deep staple, the plow will go 10 inches deep, and the subsoiler six inches, giving a depth of 16 inches, which is ample to enable the tap root of the beet to descend without resistance. It is a great mistake, however, to plow a shallow soil too deep, or to go the whole depth which has been stated in a soil that has not been deeply plowed before. The plow should be set not to exceed 10 or 11 inches, so that the furrow may not be turned over and laid flat, but set upon an edge. The latter is important chiefly in order that the surface and lower soils shall become well admixed, and that the sour bottom soil may not be wholly brought to the top to form the seed-bed.

The further cultivation and preparation of the seed-bed depends much upon the nature of the soil. With most soils, however, where the plowing and subsoiling are done in the Spring, it is the best practice to harrow and drag the land which is plowed at the close of each day and reduce it to a fine state, and thus prevent it drying hard and lumpy. When the ground has been prepared as described, and gotten into a condition requiring only one more movement with the harrow and roller before planting, it then needs to lie just so long as is necessary for the air to sweeten the sour soil which has been brought up from below, and for the sun to raise the temperature of the seed-bed above 45 degrees, when the seed may be put in.

As a part of the work of preparing the ground according to the method described, the application of fertilizers has to be considered. When the heavy acts of soil preparation are executed in the Fall, farmyard manure, and likewise a great part of the artificial fertilizers, are applied at that season. Where all cultivation is postponed till the Spring, fertilizing agents are essentially applied before the deep plowing, or in part before the ground is plowed and a further portion harrowed in just previous to planting the seed.

The subject of fertilizing, however, has such a significance in respect of its ultimate action upon the sugar value of the crop that it is not possible to give too great a consideration to its principal and more important details. We are again, in this instance, controlled in our theory and practice somewhat by the nature, but much more by the condition of fertility of the soil. If the ground is comparatively, or quite, new, and has not been previously cropped, or only one year, there is, almost certainly, no need of fertilizing, unless it may be with a specific fertilizer, which is added to counteract the effect of an excess of natural undecayed manurial matters already present in the soil. Where, however, the land has been under cropping with cereals for a number of years, and is more or less exhausted, it may be absolutely necessary to supply some part of the plant food demanded by the beet, and which is not availably present in the ground. Deep plowing very chiefly meets the requirement during the first crop, as the food stores contained in the lower soil, and which have not been in any great measure drawn upon by the cereal crops, are made available; and it is from the subsoil that the beet root obtains the chief part of its mineral support in the advanced stages of its development.

Chemically expressed, the elements most chiefly required for the normal growth of the beet are nitrogen, phosphorus, lime, and potash. A very experienced grower of beets in the north of France said to us, when walking over his beet field a year and a half ago: "A soil may be considered to be well adapted for the growth of the beet when the given constituents are present in the soil in the following proportions: In 1,000 parts of soil, 1 part of nitrogen, 1 part of phosphoric acid, 2½ parts of potash, and 30 parts of lime."

Now, in the examples of most new soils, the nitrogen is already present in great excess in the form of undecayed nitrogenous organic matter. Potash is also contained in such soils in very extreme abundance, whilst the content of phosphoric acid and lime is seldom too great and usually falls much below the proportions specified in the above standard of Mr. Dufay. A prairie soil in a Western State, upon which beets were grown in the past year, was shown to contain the given chemical bodies in the following relative proportions: Nitrogen, 3 parts; phosphoric acid, ½ part; potash, 6 parts, and lime, 9 parts.

It is very clear, from a comparison of the latter table with the Dufay standard, that no nitrogen nor potash requires adding to that Western soil. And it is also suggested that lime and phosphoric acid might be supplied with a highly probable advantage. Keeping the standards of the chemical composition of a good beet soil before us, we may proceed to a rational consideration of the application of fertilizers in general, and also in particular, to the several orders or kinds of soil of which we have spoken.

New soils, such as prairie and woodlands, are rich in undecayed organic matter. They contain a great excess of nitrogen. Farmyard manures and nitrate of soda are extremely charged with nitrogen. In consequence it would be scientifically and practically most irrational to add further the active element of those fertilizing agents which is already present in the soil in great excess. It would be the worst practice to apply farmyard manure or nitrate of soda to a new soil. Old soils, or such as have been under cultivation for several years, and in which the organic matter has become decayed, may not possess any excess of nitrogen. They may even have become exhausted of that body by hard cropping. In such examples natural manures can be applied with every advantage, and special doses of nitrogen may be added in the more active form of nitrate of soda. In applying those fertilizers to more or less exhausted soils, however, the best practice has determined that it is not advisable to apply the farmyard manure to the actual beet crop. It should be given in a strong dose to the crop which precedes the beets, so that the great abundance of nitrogen contained in the manure may be partly utilized by the previous crop, leaving so much of the unexhausted value of the fertilizer as will feed, without too violently forcing, the beets. The application of nitrate of soda to the soils requiring nitrogen is made with the greatest advantage in the Spring, and at the time of light cultivation and preparation of the seed bed. That fertilizer is extremely soluble and becomes rapidly washed down into the lower soil; consequently it must not be applied too soon before the planting of the seed. It further works very violently, and should not be given in great quantities. Many beet-growers add a portion before planting the seed and a second quantity after the plants are thinned out.

The chemical action of an excess of nitrogen in new soils, and of an overdose of nitrogenous manures, such as farmyard and nitrate fertilizers given to old soils, is very marked, and is observed in the following characters and effects:

The beets are prematurely forced and developed. They grow to an abnormal size, and are composed of a high relative per cent. of non-saccharine solids which are formed at the expense of the suger. Those organic, non-saccharine solids are found to consist chiefly of so-called gum matters, and are not only non-sugars themselves, but they prevent the formation of sugar in the beet, and, moreover, hinder the recovery of the sugar from the beet juices in the process of manufacture. Very recent experiments with fertilizers in beet-culture, by well-known scientists in Germany, have demonstrated that excesses of nitrogen manures produced large beets, containing a high per cent. of those gum or pectin bodies, and a comparatively low content of sugar.

The action of phosphoric acid in the normal development of the beet, and in inducing the formation of a high content of sugar, is most marked. In all instances, excepting only certain quite new soils, in which added fertilizers do not appear to exert any effect, the influence of phosphoric acid has been proved to be distinctly in the direction of advantage. Very numerous experiments have led to the conclusion that the addition of a given quantity of phosphoric acid fertilizer to the average beet soil produces an increased formation of sugar. The office of phosphoric acid has not only been observed in increasing the production of sugar in the normal beet crops; it has been found to exercise a controlling power in the presence of unfavorable conditions. The application of that body to soils containing an excess of nitrogen has been shown to exert a control over the baneful action of the latter element. The size of the beet is regulated, and the formation of abnormal proportions of non-saccharine matters, at the expense of the sugar, has been reduced or prevented.

The mode of applying phosphoric acid to the soil is in the form of the so-called phosphate. Lime phosphate is a particularly advantageous form of fertilizer on account of supplying two essential food constituents to the soil, which are seldom sufficiently present, and yet always expressly required.

The property of lime and its particular function are chiefly exercised in acting upon the sourness, which is highly characteristic of new soils, and likewise of certain older ones. The cause of that sourness is the presence of free acids in the soil. Lime enters into combination with those acids, neutralizing their acidity, and renders the soil wholesome and mellow. It also exerts a notable effect upon the quality of the beet and the purity of the juice.

Potash is removed in great quantity from the soil by the beet crop. One thousand parts of the leaves of beets contain about 30 parts of mineral matters, of which nine to 10 parts are potash. The root contains about one-fourth as much mineral matters as are present in the leaves, but the relative amount of potash is the same in the root as in the leaves. We see that it is highly desirable to allow the beet leaves to remain on the land at the time of harvest, in order that their content of potash may be returned to the soil. New lands usually contain an excess of potash. We observed in the instance of the Western prairie soil that a great excess of that body was present. In the old lands of Europe where the soil has been repeatedly planted with beets, the potash content has become diminished, and a replacement has to be made in some supplementary form. Commonly, the demand for potash is made good in the form of farmyard manure, one ton of which will contain about 20 pounds of potash, or by the application of special fertilizers containing potash salts. As we have already remarked, leaving the beet leaves upon the land secures the return of the greatest part of the potash which has been drawn from the soil. Likewise the refuse from the beet factories is conveyed to the land and contributes to make up the requirement in that body.

Although potash and, in a lesser degree, soda are essential to the development of the beet plant, there is an evil side to the action of those alkali bodies in respect of their influence upon the formation of sugar. The results of all scientific experimentation and practice have tended to the conclusion that the presence of excessive quantities of those alkali constituents of the soil exerts a deterrent action upon the power of the beet organism to form sugar. Where large amounts of potash exist in a soil, correspondingly greater proportions of that body are taken up and incorporated by the beet. And it has been very generally found that in the proportion in which the alkali bodies are present in the beet, above a given mean, the sugar content is decreased. The evil of the excess of those bodies passes on likewise to the process of manufacture. There are situations, consequently, in which potash, and likewise nitrogen, have to be reduced to a measure normal to the needs of the beet.

The whole subject of fertilization is controlled by the relation of natural conditions; and it comprises the endeavor to harmonize and utilize those conditions for the requirement of the beet. The special function of the beet is the production of sugar; and the proportions of the food constituents present in the soil must be supplemented or diminished in order to accomplish that end. Such appears to be the meaning and purpose of fertilization.

The Dwarf and the Giant.

King Charles I.'s gigantic porter, William Evans, was another thorn in Jeffrey Hudson's flesh, and a very big thorn, too, for the dwarf Evans was truly a giant, measuring seven and a half feet in hight. Hudson and he could never meet without squabbling, and, indeed, the very sight of this ill-assorted pair standing side by side was enough to occasion remarks that made Hudson's blood boil.

One evening, when a merry-making or masking-frolic was going on at the palace, the giant and the dwarf happened to meet. As usual, an angry quarrel took place. Evans began to tease his tiny rival by allusions to pies, venison pastries, and the like, and, in the style of the well-known Goliath of Gath when deriding David, cast reflections upon Hudson's diminutive size. Hudson, though extremely angry, tried to preserve his dignity. With a very red face he strutted up to the giant, whose knee was about on a level with the dwarf's head, and said, with an angry stamp:

"Peradventure, my friend, you have never sufficiently considered that the wren is made by the same hand that formed the bustard, and that the diamond, though small in size, outvalues 10,000 times the granite!"

At this sally Evans's mighty lungs thundered forth a peal of laughter that drowned the shouts of the courtiers, and snatching up the valiant knight he thrust him into one of his huge pockets. Holding an immense hand over the midget to prevent his escaping, Evans proceeded to take his place in the pageant, where he was to perform a dance. When this was finished he drew from his pocket a big loaf of bread, which he broke in two, and then from the other pocket he took the squirming Hudson, placed him between the half loaves as if he were the slice of meat that goes to make up a sandwich, and intimated that the King's giant would lunch upon the Queen,s dwarf.

The surprise and mirth of the spectators were gall and wormwood to poor Hudson, whose little feet could be seen kicking furiously in all directions from the sides of the loaf.—*St. Nicholas.*

Presenting Arms to a Cat.

Some 50 years ago a very high English official died in a fortress, at a place that is one of the centers of Brahmanic orthodoxy, and at the moment when the news of his death reached the Sepoy guard at the main gate, a black cat rushed out of it. The guard presented arms to the cat as a salute to the flying spirit of the powerful Englishman, and the coincidence took so firm a hold of the locality that up to a few years ago neither exhortation nor orders could prevent a Hindu sentry at that gate from presenting arms to any cat that passed out at night.—*Bombay Times.*

Bobby—I saw where your pop was buried to-day, and the monument says he is not dead but sleepin'; but I don't believe it's so.

Tommy—Yes, it is. Mam says so.

Bobby—If he was just sleepin', what did they bury him for?

Tommy—Huh! Didn't want to hear him snore, I guess.—*Life.*

Conducted by Emily S. Bouton.

No More Bric-a-Brac.

Listen, housemaids, to my song,
Send the joyful news along.
Lift your troubled hearts from care.
Wave your dusters in the air.
No more hard-earned wages clipped
To repay for treasures chipped.
Sing and dance and laugh and shout,
Bric-a-brac is going out!

Join, ye husbands, in the strain.
Yours the profit and the gain.
No more jaunts with wife to seek
Costly nothings called "unique."
No more monstrous bills to pay
For some ugly bit of clay.
Fashion puts the fad to rout,
Bric-a-brac is going out!

Comfort, lovers, fall in line!
Bend the knee at Fashion's shrine;
Give that cranky dame her due,
Since she proves so kind to you.
Homes no longer will be shops,
All that sort of thing she stops.
You'll have room to walk about,
Bric-a-brac is going out!

Down, ye objects, useless, old—
Worth one time your weight in gold.
Dust-collecting stuff, avaunt!
From each nook, and niche, and haunt,
Off! ye foes to brush and broom,
Cumbering shelf and mantel room.
Jar, and vase, and candlestick,
Fall in line! March! Double quick!
Hear ye not the foeman's shout—
Bric-a-brac is going out!

—*Ella Wheeler Wilcox in Life.*

The Editor's Fireside.

TO THE homes where it is a welcome guest, THE AMERICAN FARMER sends greeting for the early Spring. For March is here, not always a pleasant month, with its gloomy skies, its biting winds, its many disagreeable reminders of the Winter just passed away, but still the beginning of a beautiful season when Mother Earth is making ready to put on her gala robes once more. There is something in the Spring that is inspirating, that makes one feel that life is worth living, that sends the blood coursing more rapidly through the veins in consonance with the rising tide of life in the world of blossoming trees and budding flowers. There will be less time for reading around the fireside, but there will be gathering needs for consultation about what to do, and how to do, to make home and its surroundings more attractive. And in these columns, we trust, will be found many good things—many that will be helpful in this direction.

To make assurance doubly sure, every woman reader of THE AMERICAN FARMER is requested to write and make inquiries about what she desires especially to know, and not only that, but if she has discovered some new ways of rendering home pleasanter, let her tell all about it for the benefit of others. Letters containing inquiries and suggestions will be welcome. The more the better.

* * *

WOMEN who have followed the trial of the pretty Florence Ethel Osborne, of London, for stealing the jewels of the friend whom she was visiting, will find themselves strongly moved by the attitude of the young husband who married her knowing the shadow of the accusation, but believing entirely in her innocence. Even now, when it has been proved that she is guilty, he remains by her side in the midst of her deep disgrace, endeavoring to keep up her courage and prevent her from sinking utterly beneath this terrible blow. We are all accustomed to what we may call the dog-like devotion of women to men whom they love, even though they be utterly unworthy. It is often an absolutely unreasoning affection that holds them to their side even when they have abused and cast them away.

In this case it was the old, old story, of sudden temptation caused by envy, and then followed by detection, ruin, and flight. The guilty woman did not go into exile alone, but the man whose confidence she had betrayed went with her, thus sharing her disgrace when few would have blamed him had he left her to face it alone. The rarity of the case is what attracts attention. The history of the past shows that ordinarily, when the wife's good name is shadowed, the husband enters the divorce court in order to vindicate in this way what he calls his honor. The woman seldom leaves her husband who has become an outcast and disgraced, but follows him to the very last, whatever may be the consequences. Capt. Osborne's conduct has caused the widest comment, both because of its nobility and its rarity.

While despising the weakness of the woman who could for the sake of vanity commit crime, thus ruining not only her life but her husband's, and casting a shadow over all connected with her, it is yet hard not to pity her, and not to feel that she who had been her friend, even though her confidence were betrayed, was hard and unmerciful. No one can tell, or even guess, at what moment she may be brought face to face with a temptation so overpowering that for the moment there is no resistance. The happy accident of interruption, some sudden word or look, has saved many a life from utter ruin. We cannot be sure of our own strength, and the moment in which we seem to be safest may be that one preceding our fall. It is because this is true that all women need to be true to each other.

Not long ago I heard a gentleman say that women were more cruel in their judgment of other women than any brute of the forest that tore and tortured his victim. That he was right in a measure I could not deny; and yet it seems to me that there is a growth in the direction of a broader charity, of gentler judgment, and of a greater willingness to acknowledge the law of the unity of humanity. Doubtless in the case of Mrs. Hargreave there was added to the loss of the jewels a deep sense of injury that one she had taken to her heart had so betrayed her, and yet the very fact that they had been loved and loving should have moved her to mercy. In this case the man, who had been so much more deeply injured, shamed the woman by his larger nobility.

* * *

I SAW somewhere not long ago that a lawyer, whose business it is to do a great deal of conveying real estate, made many complaints of the careless way in which women treat their own names. He said that in numerous cases he had great difficulty to identify individual women, for the reason that they had changed their first names several times, as the fancy had happened to take them. For instance, a girl might be Kate to-day, and next year, or the year after, Catherine spelled with a "C." Later on it might occur to her that Catherine spelled with a "K" would look better, and then "K" the initial letter would become. When she comes to marry and is called upon to sign a deed, she will use not the name given to her at her birth or christening, not, perhaps, the name she has been known by through her girlhood, but by the diminutive that chances to be her favorite. Sometimes she will employ her middle name, and sometimes omit it. Perhaps the fancy will strike her to use her husband's initials. In this way the task of the lawyer who has to follow them up will not be a trifling one.

I do not know that there need be any sharp or angry criticism on the part of this professional gentleman. First, he may very likely belong to a class of men who would most strongly object to his wife becoming a business woman, or bothering her brains, as he would call it, about business methods. It has only been within a few years that women have sufficiently understood the importance of business knowledge, even when they are happy wives and mothers, to give themselves any trouble in learning the best methods of transacting business, or of knowing how it should be done. The inevitable consequence is an awkward ignorance of what should be a familiar thing.

The aggrieved lawyer might be comforted by learning that it is becoming a common custom, or at least that it has gone beyond a mere fashion, for women to sign their full names to all documents, even to letters. If married, the middle name is dropped, and the maiden name written in its place—a very sensible thing, by the way, since it preserves something of the identity of the woman with the girl. Of course, if this is crystalized into an established and general custom, the trouble with the signatures will be done away with.

This is a good place to repeat what I take every occasion to say to women: "Do not be satisfied until you have possessed yourselves with a knowledge of some of the plain business principles, whether you can see any probability of being called upon to use them or not." There is scarcely a woman living who will not sometimes find this knowledge advantageous. It will often save her a great deal of trouble, will prevent her from being victimized, and will add to her self-respect. The day has gone by, or nearly so, when dollbabies are the ideals of men. The ability to hold her own under all circumstances is at any rate a most invaluable possession, and a knowledge of business methods will certainly help her to do this.

The carelessness above spoken of in regard to the name grew, of course, out of the fact that a woman lost her own at marriage by assuming her husband's. Like a great many other things, it was the outcome of what seemed in those days a proper thing, and what could hardly be expected to produce bad results.

PLAYING PROVERBS.

Something for an Evening's Entertainment.

There are several methods of playing proverbs, each of them requiring great rapidity of thought, and a good memory on the part of all engaged in the game.

The best-known way of playing the game is to ask one of the company to leave the room, and during his absence the others decide upon the proverb, one word of which is assigned to each person, who must introduce that word into the answer he or she makes to the question to be asked them. The number of questions to be allowed must be decided by the company.

The one who had left the room is then recalled and informed who has the first word of the proverb. He must, beginning with this person, ask the allowed number of questions of each person, in turn, and endeavor to find from the answers their words of the proverb; and if, after hearing from all, he can give it, he can take a seat in the room, and the individual whose answer gave him the first clue must take his place as guesser of the next one.

Much ingenuity is sometimes required to form a sentence which will answer the question and yet contain the word. A very nice illustration of this was given at a party where the proverb chosen was: "As useless as carrying coals to Newcastle." This last word, being a very difficult one to use in answer to any ordinary question without attracting the suspicion of the questioner, was given to a lady in the company who was noted for her quick wit. She was asked, "Is it a *familiar* quotation I am to guess?" Quick as thought came her reply: "It is as familiar as 'coals to Newcastle.'" The very audacity of the answer put the questioner off from the scent, and he failed to catch the correct proverb, and, in consequence, had to go around the circle again the second time, finding a correct clue before reaching this lady.

Another way, and one that is generally popular with young folks, is called "Shouting Proverbs." In this, all shout their words together as the guesser enters the room, making a perfect babel of sounds, from which words enough must be gathered to make, when connected with others, a clue to the proverb. This requires great concentration of thought on the part of the guesser, and, as it is considered to be a little more difficult than the first-named method, he has three chances given him.

A third manner of playing this game, and one that causes much amusement, is that called "Split Proverbs." In this, all of the players are seated around the room, and the leader, giving the first half of any familiar proverb, throws a handkerchief to any person in the room, who must finish the sentence correctly, or incorrectly, while the leader is counting 10. If he fails to do this, he must pay a forfeit, and throw the handkerchief to a third person, who finishes it, gives the first part of another, and throws the handkerchief to No. 4, and so on until all have been heard from, when the forfeits are sold. The more absurd the sentences are made, the more fun it will cause. For instance, the leader says: "A rolling stone" (the person to whom the handkerchief is thrown adds)—"knows its own father"—"A wise son"—"gathers no moss"—"Make hay while the sun"—"sweeps clean"—"New brooms"—"flock together," etc.

The anxiety to answer in time, will, in a majority of cases, cause the players to give very absurd retorts, or else make them completely dumb.

ART-WORK NOVELTY.

Easy to Do and Effective.

A novelty in the way of art-work has been discovered recently, writes some one in *Cassell's Magazine*, which shows a very easy method of decorating articles for the house that render them beautiful and yet at the same time it is very easily done. The process comes from Berlin, and it can be employed upon all sorts of articles, both large and small, and with most excellent effects. It is called an application of "Emails." These come in all colors; indeed, there are 48, including gold, silver, and copper bronze, which are put up in boxes of different sizes. In these boxes are also brushes which are to be used, and with them also comes the thinning medium with which the Emails may be thinned, if necessary. Where the Emails are sold there are usually terra-cotta ornaments for painting that may be bought with them. On some of these the designs are cut or incised, and this renders the work easier.

The process is described as follows: With a large brush put on a coat of what is called Cloisonne lacquer, having made sure first that no dust is upon the article; let this dry, and then fill in the incised lines with the gold, silver, or copper bronze. After this is done and it is dry, the rest of the design can be painted with the other colors, according to the taste of the worker. Small camel-hair brushes are used. The colors must be painted on evenly, and therefore it is necessary to thoroughly stir them up before any are poured out into the saucers for use. Care must be taken not to permit them to run into the gold or bronze outlines, as these must be kept bold, clear, and sharply cut. After the design is painted, then the article must be set away where nothing can touch it and where no dust can settle upon it, until the Emails harden thoroughly.

This will take only a few hours, and then the surface is brilliant without any firing or varnishing. By using these Emails and the real Cloisonne ornaments, those of Dolton can be imitated perfectly. Of course, it goes without saying that they are not equal to the real thing, but they are very pretty, and people who would neither go to the expense nor trouble of China-painting can do this work with good results. These Emails can be utilized for house decoration; designs on door panels and friezes could be made that need no varnishing, and yet can be washed without injury. This work has not become known this side of the water, but it is quite popular in Berlin.

Some Spring Fashions.

For Spring, capes with a military air divide the honors with the box coats which have been so popular. They are to be made without trimming, but with pretty, gay-colored linings.

White net mask vails have taken the place of all other kinds, while the red vail has entirely disappeared from the toilets of fashionable women. These mask vails are cut in lengths to allow them to be lapped at the back of the head and secured with small, fancy pins thrust through the ends.

Ribbon strings three or four inches broad are equally fashionable for hats and bonnets. They are attached at the back, and it is a fancy to twist them three or four times in order to make them narrow before tying them in a bow under the chin.

The newest styles in India silk, which are to be popular for Summer wear, have large all-over figures in dainty colors and patterns. Their softness and exquisite shading prevent any *bizarre* effects from the size of the figures.

Girdles are to be worn, which may be laced or clasped, and may be as narrow as belts beneath the arms, or be wide enough to extend from the armpits to the hips as fancy may dictate.

Medici collars will be worn by those who find them becoming, but rolling collars will be just as popular.

Basques that contrast with the skirt are just as stylish as those that are made of the same material.

WORK FOR BUSY FINGERS.

Some Pretty Things for Home Decoration.

HEAD REST.

Sections of silk 14 inches long by 10 inches wide form the front and back, and between them separating the edges is a full puff of silk. Light-blue silk is pretty. The filling may be of cotton, hair or down. Over the front is a section of bolting cloth, on which is embroidered a spray of apple blossoms and leaves. The cushion is tied to the front of the chair with bows of pale-blue and pink ribbon.

MIRROR DECORATION.

One and one-half yards of broad, light-green satin ribbon. Fringe the ends and embroider above the fringe a bunch of yellow daisies. Through the center trace with gold paint the words—

O wad some power the giftie gie us
To see oursels as ithers see us.

This is to be thrown across the top of the mirror.

PAPER RACK.

One yard of blue China silk; one yard of old rose lining silk; a brass banner rod with chain and two dozen small brass rings. Sew the outside and lining silks together on the wrong side, then turn and press, and close and finish the unsewed end. Fasten the brass rings along the ends in such a way that the rod may pass through one on each side alternately. Fasten the chain to ends of the rod to hang the rack against the wall. Print in gilt letters the word, "Newspapers" across the front.

JEWEL BOX.

Cut three triangular pieces of pasteboard of the size and depth desired. Cover the outside with light-green velvet and the inside with gold-colored silk. Join the sides with narrow ribbons, put on to simulate lacing, and tie at top and bottom with a full bow. The lid and bottom are made triangular to fit the other pieces. Put a layer of cotton batting under the lining of the bottom and sprinkle with sachet powder. Fasten the lid on with bows of ribbon. A bow is tacked to one corner of the lid to raise it. Join the bottom to the sides with overhand stitch.

Luncheon Menu.

Bouillon.

Veal Croquettes.	Peas.	Creamed Potatoes.
Shrimp Salad.		Cheese Crackers.
Orange Pudding.	Olives. Salted Almonds.	Cake.

Chocolate and Tea.

RECIPES.

For Home Cooking and Home Eating.

POTATO MUFFINS.

Grate two good-sized potatoes in a pint of milk. Add one-half teaspoonful of salt; two eggs well beaten, and flour enough to make a stiff batter. Beat this well, and then add a teaspoonful of melted butter or lard. If lard is used, a pinch more of salt must be put in. Add a teaspoonful of baking powder. Put muffin rings on a greased griddle, fill the rings to the depth of one-fourth inch, bake a moment, then remove the rings and turn the cakes. Bake until thoroughly done. They must bake slowly. Serve hot.

LEMON PIE.

This pie should have two crusts. Filling: Chopped rind of one lemon; juice of two; one cupful of chopped raisins; two eggs; one teaspoonful of flour stirred in one-half cupful of water; one cupful of sugar. Mix ingredients together and put between the crusts.

LEMON ICE.

Two tablespoonfuls of gelatine soaked in water enough to cover it, for one hour, one cupful of boiling water stirred into the gelatine until the latter is thoroughly dissolved. Add three cupfuls of cold water, three cupfuls of sugar, and the juice of nine lemons.

PICNIC BISCUIT.

One pint of flour, one tablespoonful of butter, one coffee cupful of milk, one-half teaspoonful of salt, mix, mold, or pound a half hour. Cut in round biscuits and prick top with fork.

THE APIARY.

Hummings.

Nobody yet seems to have found out exactly the right temperature for a cellar in which hives are Wintered. The best rule yet given is that temperature is best in which the bees seem quietest.

It shows the ignorance of honey-buyers that they prefer the white comb to the darker, but honey-sellers have to humor their ignorance.

Some bee-keepers oppose the giving of bounty on honey, because they think all bounties are wrong, and because they fear that such an impetus will be given honey-raising that the bottom will fall out of prices.

Sending queens by mail first began in 1860. For years there was much danger in this, but now queens are not only sent safely to all parts of the United States, but to Europe and Australia.

The Punic bees are the tamest and gentlest of all the bee family, and their sting the least painful. The sting of the Syrian bees is the most painful.

There are at least one dozen glucose honey establishments in Chicago, and one of these reports sales last year of 200,000 pounds. The most of this is put up in glass packages holding three-fourths of a pound, and sold to retailers at 87½ cents per dozen packages.

Rev. J. L. Johnston says that aster honey is all right until frost comes. After that if the bees are allowed to work in the flowers they get poisoned.

Every farmer who raises bees should also raise alsike clover. This will be found a profitable crop in itself, as 10 bushels of seed can be raised to the acre, which will sell at from $7.50 to $9 a bushel, and beside the hay is very valuable. The common objections to it are not well-founded. It makes better hay than red clover, and more of it. Its tendency to make white the butter of cows fed upon it can be cured by adding a few carrots and such roots to the ration.

Poplar tree flowers make good honey, of pleasant flavor and fine amber color.

The Iowa bee-keepers have had two poor seasons, but they are hopeful of making money this year.

M. Herman, Indian Territory, reports that last year he got 3,650 pounds of honey from 92 colonies. His best hive yielded 157 pounds of comb honey. He netted $500 for his crop.

There is much money in bees, but it needs to be brought out by brains, patience and perseverance.

The bee-keeper should increase the number of his colonies every year.

New colonies started this Spring should be placed where they will be sheltered as much as possible from the raw winds. The March winds are very trying to all bees. Windbreaks should be carefully provided.

The Wisconsin bee-keepers propose to make a very fine exhibit at the World's Fair.

It is important to have a good supply of extra combs—at least three for each working colony, Spring count.

Comb foundation is an advance in bee culture, second only to the movable frame hive. It should be used in full sheets as much as possible, to prevent the building of drone comb. Too much should not be put into a hive at once.

Mr. Danniher, of Madison, Wis., tells how to get the most honey from a box-hive without increase: "When the lower part of combs in the box-hive are whitening with new honey take a hive full of frames of empty comb and place it on the stand occupied by the box-hive, cover it with a board out of which a large hole has been cut, place the box-hive over this hole and fasten up all other openings, the bees will then fill the frames in the lower hive, they can be extracted and returned; the bees will rarely swarm when treated in this way, and they are sure to Winter well, having a good supply of honey in their own hive."

Bee-keepers differ as to whether cement, sand, or natural earth is the best flooring for a cellar in which bees are Wintered. All agree that a bushel of lime is an excellent thing in the cellar.

The *Canadian Bee Journal* says that for years that general farming has not paid so well as bee-raising.

To make passages through the combs, J. E. Hetherington takes strips of refuse tin, about ⅞ of an inch, and rolls it up into small tubes. These are pressed into the comb, the pieces of comb punched out, and the tubes left in.

C. A. Montague, Archie, Mich., thinks that milkweed has been abused too much. In good years in Northern Michigan bee-keepers get 300 pounds per colony—one half milkweed, one-third basswood, and the remainder mostly raspberry and golden rod. In poor years the product drops to 60 pounds, all basswood and milkweed, the latter averaging twice as much as the former.

Florida bees are small, black, and very spiteful, as might be expected, since they work all the year.

The quieter bees are kept in Winter—and in Summer, too, for that matter—the better. Uniform temperature during their season of rest is very desirable.

Dr. J. A. Lintner, New York State Entomologist, does not believe that bees are injured by spraying, and in this view he is sustained by entomologists generally. But he recommends that spraying be delayed until the blossom has fallen off, except in the case of the plum and some others, where it is necessary to spray as soon as the leaves appear. New York bee men take exceptions to his statement, and claim that spraying, which they admit was done while the blossoms were on, was very fatal to bees. Paris green on potatoes was equally so. They have passed a resolution condemning spraying during the flowering season.

Southern beeswax is harder and stronger than Northern.

GRADING COMB HONEY.

The Proposed Chicago Grades, and Those Adopted at Albany.

THE CHICAGO GRADING.

First grade.—All sections to be well filled; combs straight, of even thickness, and firmly attached to all four sides; both wood and comb to be unsoiled by travel-stain or otherwise; all the cells sealed, and the honey of uniform color.

Second grade.—All sections well filled, but with combs uneven or crooked, detached at the bottom, or with but few cells unsealed; both wood and comb unsoiled by travel-stain, or otherwise, and the honey of uniform color.

Third grade.—Sections with wood or comb or both, travel-stained or otherwise much soiled, and such as are less than three-fourths filled with honey, whether sealed or unsealed; and crates containing two or more colors.

Fourth grade.—All crates filled with honey not described in any of the foregoing grades.

THE ALBANY GRADES.

White honey shall be graded in two grades:

The first to be known in the trade as "fancy," or "fancy white," and to be marked "A." It shall be composed of well-filled sections of light-colored honeys. One face of each section shall be perfect in appearance, fully sealed, except the line of cells touching the wood. The other side of the section shall either be perfect in color and sealing, or nearly so.

The second grade shall be known in the trade as "fair to good white," and be marked "C," and shall be packed to meet the requirements of those desiring a good honey, but who care little for outside appearance. It shall be composed of honey thrown out of the first grade, irregular and travel-stained combs, sections not perfectly filled, but yet having but little unsealed honey.

The third grade shall be known as "mixed honey," and shall be composed of white honey chiefly, mixed with inferior honey, including buckwheat and Fall flowers, and shall be marked "M." We advise that combs so badly stained as to have the color of saffron be thrown into this grade.

Buckwheat honey shall be packed by itself and be marked "B."

Those bee-keepers sending to market boxes known as "pieces" shall put upon them a private mark of their own. This should also apply to honeydew, and any other kind not falling into regular grades.

What Constitutes an Italian Bee.

The committee of the North American Bee-Keepers' Association on Standard of Excellence, made the following report, which was adopted: Italian bees must adhere to the combs when properly handled, and not cluster about or rush around and fall to the ground. They must have three bands, of a color ranging from golden yellow to leather color. They must be quiet when well handled, and in time of scarcity must place their honey in a compact shape.

Schedule of marking, in a schedule of 100 points:

Comb building, 10.
Honey-gathering qualities, 40.
Prolificness, 20.
Wintering, 15.
Gentleness, 10.
Color, 5.

New York State Bee-Keepers' Association.

Pres., I. L. Schofield, Chenango Bridge; V.-P., W. E. Clark, Oriskany; Sec., G. H. Knickerbocker, Pine Plains; Treas., G. M. Doolittle, Borodino.

Eastern New York Bee-Keepers' Association.

Pres., Thomas Pierce, Ganesvoort; V.-Ps., H. W. Garrett, Coeyman's Hollow; Sol. Vrooman, Hartford; Sec. and Treas., W. S. Ward, Fuller's Station; Ass't. Sec., E. W. Philo, Half Moon.

Illinois Bee-Keepers' Association.

Pres., Hon. J. M. Hambaugh, Spring, Ill.; V.-Ps., Mrs. L. Harrison, Peoria; Mr. P. J. England, Fancy Prairie; Dr. C. C. Miller, Marengo; C. P. Dadant, Hamilton; N. S. Black, Clayton; Sec., Jas. A. Stone, Bradfordton; Treas., A. N. Draper, Upper Alton.

Wisconsin Bee-Keepers.

The following officers have been elected: Pres., C. A. Hatch, Ithaca; First V.-P., Mr. Standis; Second V.-P., J. J. Ochsner, Prairie du Sac; Rec. Sec., H. Lathrop, Browntown; Cor. Sec., Dr. J. W. Vance, Madison.

California Bee-Keepers.

A State Association has been organized with a membership of 43, and the following officers: Pres., J. F. McIntyre, of Fillmore; V.-Ps., L. T. Rowley, of Los Angeles County; F. H. Hunt, of San Bernardino County; J. A. Odell, of San Diego County; Sec., J. H. Martin, of Riverside; Treas., G. W. Brodbeck, of Los Angeles.

The Executive Committee will consist of the officers of the Association, and Messrs. Allen Barnett, of Whittier, and J. W. Strong.

North American Bee-Keepers' Association.

Pres., Eugene Secor, Forest City, Iowa; V.-P., Capt. J. E. Hetherington, Cherry Valley, N. Y.; Sec., W. Z. Hutchinson, Flint, Mich.; Treas., E. R. Root, Medina, O.

Strychnine to Cure Drunkenness.

A Russian physician named Portugaloff declares that strychnine is an infallible cure for drunkenness, administered in subcutaneous injections. He asserts that the experience of physicians has shown the cure to be as rapid as it is certain. The effect of the strychnine solution is to change the craving for drink into positive aversion, and this change is effected in a day. After a treatment of eight or ten days a patient may be discharged. The strychnine is administered by dissolving one grain in 200 drops of water, and injecting five drops of the solution every 24 hours.—*Hall's Journal of Health.*

Busted Booms.

It is said there are 20 well-built towns in Kansas without a single inhabitant to waken the echoes of their deserted streets. Saratoga has a $30,000 opera house, a large brick hotel, a $20,000 school-house, and a number of fine business houses, yet there is nobody even to claim a place to sleep. At Fargo a $25,000 school-house stands on the side of the hill, a monument of the bond-voting craze. A herder and his family constitute the sole population of what was once an incorporated city.

There is a woman in Bonham, Tex., who does a good business in sewing buttons on men's wearing apparel, doing the work on the streets.

Skimmings.

Cows should not be constantly stabled during the Winter. The general health of the animal will be better if allowed an opportunity to move about in a sheltered yard every day.

As with man so with the cows, cleanliness is a very important factor in health. Give the cow a clean stable, and card her frequently and regularly. The animal will give richer, purer milk if these necessary cares are attended to.

As 87 per cent of milk is water, the dairyman should see that cows get none but the purest water to drink. Stagnant water poured in pools if drunk by the cow will soon affect the liver not only of the cow but of the milk drinker. Such milk is especially unhealthy for infants, and many of the ills of infanthood may be easily traced to the cow and its surroundings.

Fifteen Ayreshire cows kept at Cochichewick Farm, Essex County, Mass., ranging in age from four to 14 years and 220 to 365 days in milk, gave last year an average 5,741 pounds milk, the daily average running from 15.21 to 23.38 pounds.

Short-horned cows will consume from 100 to 125 pounds of green clover, and if a less amount than this be allowed there will be a noticeable falling off in the quantity of milk. In cutting down the ration of clover other food should be substituted.

Compound ensilage, made from millet, clover, oats, and peas grown together, will contain as digestible nutrients—albumnoids, 2 per cent.; carbohydrates, 11 per cent.; fat, 0.5 per cent.

The imported Swiss cow Brienz, exhibited in Chicago, is 12 years old, weighs 1,600 pounds, and made the highest record ever reported, giving in three daily consecutive exhibitions 3.25, 3.03, and 3.1416 of butter fat.

By careless inattention valuable cows have been known to become deaf. Keep the ears thoroughly cleaned. In the field and in the stable insects and dust enter the cow's ears, and the accumulation causes deafness.

A great deal of dirt is carried from the milkman's wagon to the kitchen when milk is served in open dishes or pans.

A rich and occasionally good food for cows is cornmeal fed with hay and well mixed. A too frequent diet of this will, however, produce fat instead of milk.

The proper temperature for creamchurning in Winter is from 60 to 64 degrees.

Dairy schools are now, and justly so, very popular throughout the country. Young men and young women deciding to remain on the farm should take advantage of the educational advantages thus offered, and be able, in a comprehensive and systematic way, to produce from the dairy butter and cheese of most excellent quality, which will return a larger revenue than that produced in the old slouchy way.

Scatter powdered charcoal about the illy-smelling pool in the stable-yard, and in the stables also. This will be found to be a capital deodorizer.

Cowboys drink only condensed milk. This item may deter some of our youngsters from entering that profession.

How Edward Burnett thinks that "cows are made; not bred." He says take the best bred calf and put it into the hands of one man, and a poor cow results, while in another man's hands the same calf would make the highest type of dairy cow. Hence his theory.

Following the idea that "to him that hath shall be given," a writer suggests that it is the worst sort of economy to try and raise live stock without hay prepared with plenty of feed and shelter to carry them through the Winter. Well fed and well cared for live stock will pay on any farm, but "no farmer can make money by sheltering and caring for a list of scrubs." Thus, from the scrub, which hath not, shall be taken that which he hath.

The advantage of barn cisterns cannot be over estimated. Providing water for the stock, they prevent water from the roofs filtering through the manure.

When the farmer finds his cattle with a husky cough he may attribute the same to indigestion from over feeding. Cut down the supply 50 per cent. for two days and the result will be immediately beneficial.

Careless and unkempt attendants who force cows into filthy stables are responsible for the inferior if not poisonous milk served to customers. Clean surroundings conduce to good health, whether of man or beast. Time consumed in making a cow comfortable will be as money in the dairyman's pocket.

If you find that your cow has a tuberculous tendency, dispose of her at once. Her usefulness is of the past.

Dr. Harris, an expert upon the subject of milk, is credited with the statement that the relative amount of fat in milk can be changed by varying the rations of cows.

The average farmer can hardly be said to keep cows; he merely tolerates them. —(Dr. C. A. Robinson.)

The average baby cannot always be said to keep milk; it can't stomach it.

A lady recently gave a "pink" breakfast. Of course that color predominated about the table and room. In order that the ensemble should be in every way complete, the hostess arranged with her "butter man" to have pink butter. The rich, June-colored butter offended her artistic eye. The guests were pleased at the novel idea, but did not disturb the butter.

An ex-Governor of Wisconsin recently became enthusiastic over New England dairies, and wants the Western farmers to "visit some of them that yield 300 to 400 pounds of butter per cow." He fails to mention how long it will require a New England cow to yield 300 or 400 pounds of butter.

A farmer in Maine has a cow which has been tied to a certain place for two years. She will drink only hot water, and her menu is three pints of buckwheat meal and a small quantity of hay per diem.

Some farmers become over enthusiastic and seek to overstock their farms with live stock. This is true mostly of young gentlemen and theoretical farmers. The practical farmer begins with a few live stock, and when the capacity of his farm has been reached he does not undertake to keep more. At this stage he begins to sell off his overplus of stock.

More butter per head is used in England than in any other country. There they use 13 pounds per head per annum. In Germany, eight pounds; Holland, six pounds; France, four pounds; Italy, one pound.

In Mexico the dairies are not by any means models of cleanliness. When the cows are driven from the prairie or from the mountains to be milked, they are run into a yard or corral surrounded by high adobe walls. Mud to the depth of a foot is in the rainy season amalgamated with filth by the constant tread of the cows. The farmer must first catch his cow, and these are not always tractable. He then, having lassoed the animal, makes a half hitch to the tail and draws that appendage over the back and fastens with a rope to the horns. The hind legs of the cow are then tied, after which the male milker calls for a calf, for without the presence of said calf the cow will not give down its milk, the calf claiming the first "pull" for the weakish lacteal, and it must be the cow's own calf. No other mother's calf will do. After the calf has taken a few swallows the Mexican takes the teats and draws the milk. These calves, sometimes to the number of 20, are kept in a separate corral during the night, away from the mother; hence their alacrity in the morning to assist at the milking. The milk is received in large ollas, and generally is drunken warm and unstrained. No attention is paid to the cow's bodily comfort, and if she cannot find sufficient food about the prairies she must go hungry, as they are never fed in stable.

AGRICULTURAL CHEMISTRY.

Some Researches that Should Be Made and Information Given by the Experiment Stations.

EDITOR AMERICAN FARMER: The chemists of our Experiment Stations have almost without exception confined themselves to those analyses of fruits, vegetables, and cereals which would show their *food values* rather than the amount of nitrogen, phosphoric acid, and potash which they drew from the soil to constitute them perfect plants, with leaves, stalk, and grain. Yet none are more free to confess that every species of plant, shrub, or tree requires these essential elements in very different proportions. Thus, corn takes 1 pound of nitrogen for every bushel; seed cotton about 3 pounds for every 100 pounds of seed, and oats about 173 pounds per acre. But when we look after that of strawberries, gooseberries, melons, peaches, apples, etc., we are without definite data. Now, it is evident to everyone that this information ought to be easily accessible to everyone. If our land will without manure grow 10 bushels of corn per acre, what kind and what quantities of manure should be added to make a good paying crop of strawberries, admitting that soil and climate are suitable to their growth? Until we know these primary constituents it is evident that we must grope in the dark. With manures we may force growth at expense of stalk, strength, and of fruit. Then every pound of substance that does this is money and time thrown away, the last the most valuable of all, for it can never be regained.

One who looks over what our Experiment Stations are doing must admit, too, many are doing the same thing, and that not always the best one either for their section or the farmers generally. A late Bulletin giving experiments in melon-growing states that they may be planted too early, but neither the temperature nor moisture of the soil for the two dates is given, or their averages for the growing season—most important information.

Soyer, the celebrated French cook, weighed all his condiments, and saw that the heat was kept at the given hight the requisite time. His dishes were famous for quality. Farmers wanted to know at what temperature and moisture to plant and sow to get the best stand, and whether their uniform hight and per cent. from years of observation will give a certainty to their crops, and, as allied to this, the heat and moisture that will render the elements already in the soil, furnished by fertilizer, manures, or green crops turned under, available for their growth.

Here is the wide field for the agricultural chemist, who, in his laboratory, can reproduce almost perfectly the natural condition, now that electric lights promise the intelligent investigator such a short cut.

Farmers now understand how to use thermometers; it is the part of our Experiment Stations to teach them how to the best advantage. The Signal Service is day after day adding from unusual and unpublished sources the temperature of sections about whose past history nothing was known. These are being brought to light every day because sought after.

The farmer who pays the bulk of the taxes, direct and indirect, has a right to have the very best and latest information that the Government, State, or National can give him. They ought to be satisfied with no less. And of these the best soil, the temperature, light, and humidity from day of planting to that of gathering are the most important of all. Our Experiment Stations so far have absolutely taught them little generally useful or practical. In this State the mass of farmers are neither horse raisers, cattle feeders, swine fatteners, or sheep growers. They want to know more of these other things, and their proper applications to all crops that have been, or can be, grown here.—H.

Food Value of Cotton-Seed.

Agricultural chemists estimate the nutriment of 100 pounds of cotton-seed meal as equal to 318 pounds of corn, or to 767 pounds of wheat bran.

Stable Talk.

Senator Leland Stanford has no idea that the bottom has dropt out of high prices for trotters. The low prices at the sale in New York were due to various causes. He was taught a valuable lesson by them not to put any colt on sale until his speed had been thoroughly developt at the breeding farm. As soon as he saw how prices were running he withdrew one valuable colt—by Azmoor, dam by Don Victor—and presented him to a friend rather than see him sacrificed. The Senator spoke against the general prejudice in the East against what is termed "running bred foolishness in the trotter," and there was not "a single trotter of low record that does not possess more or less of what is denominated 'running-foolishness.'" Next Summer he is going to ship some Electioneer mares from his farm at Palo Alto to St. Petersburg. He is going to St. Petersburg himself and select some mares and stallions from the Czar's Orloff Stud and breed them. He thinks the Orloff horses are going to be very popular for rich people's carriages. They are not so fast as the American trotter, yet he has seen one trot in 2:30 before a heavy cart with small wheels. They are large and showy, have the best of feet and legs, have much endurance, and spirited, yet tractable. The principal colors are gray, black, and bay.

When the yearling Bell Bird made her record of 2.26¼ she carried a nine-ounce shoe in front and a three-ounce behind. Beautiful Bells is the only mare that has had two of her foals hold the yearling record, although Bell Bird did not hold it long.—*American Horse Breeder.*

Senator Leland Stanford believes in shoeing trotters just enough to protect their hoofs. "The trotter of the future will need no weight to keep him level, and he will be so sure gaited also that he will need neither boots to protect him nor weights to square him at the trot."

Sontag Mohawk is 17 years old, and has seven children in the 2:30 list. Alma Mater is 20 years old, and has five in the list. Beautiful Bells is 20, and has five in the list.

The Vermont woods are full of promising fliers, whose owners are confident of smashing records badly this season.

It is said that scratches in horses can be cured by bathing with thick sour buttermilk.

Alfred H. Moore, of Philadelphia, recently paid $69,850 for five breeding mares.

The Californians say that Palo Alto is going to be King of the races this year.

BREAKING STEERS.

They Should Be Treated Gently, Patiently, Intelligently, and Firmly.

EDITOR AMERICAN FARMER: The question of how to break steers to the yoke may be of interest to some farmers. They should be put in a yard that is clear and yoked together. Never tie their tails together, as was an old custom, to prevent their turning the yoke. Put a halter on the near-side one to prevent their running away, and with the halter in one hand and a whip in the other commence driving them gently, seldom using the whip. If they are stubborn urge them gently. Harshness only makes them worse. If they are disposed to run let them have their way. The yard will prevent them from getting away from you. After worrying awhile, let them run a little while alone, for an hour or two, occasionally giving them a drive. They should not be driven to make them tired or leg-weary. This is the cause of some oxen lying down when they get a little weary. When they get a little used to driving, they should be fastened to something light to learn to draw. A pole or a sapling is very good. After a drive of a few hours every day they will generally get gentle enough to partially dispense with the halter. It should wholly be dispensed with as soon as possible. After they get a little used to drawing they should be put to a cart or wagon and taught to back. It is a very good plan to commence backing where the ground is a little descending at first. Oxen, if properly managed at first, can be taught to back nearly as much as they can draw, which is often important. After they get so far broken that they will draw light loads, they should be driven a short distance and stopped, and be taught to hold up their heads. This is generally easily done. At first it will be necessary to lift up the yoke on the near steer by hand; and putting the right knee under the bow, and a little motion of the foot under the off-side one's chops, will bring his head up. A little practice in this way, and a motion of the whip, will make them raise their heads at the word, when they stop. This always makes oxen show to good advantage.

Oxen and steers should never be halloed at as if they were deaf, much less whipped, only in case of necessity. Patience and kindness should be freely exercised in breaking steers. A good whip, with a light, slim lash is best, and when it is necessary to use it let it be a snap rather than a stroke with the whole lash. An ox should never be used to expect a blow before he starts, but learned to start at the word; and if they are not overloaded and mauled to make them draw, instead of their becoming drones they will be spry and active, and will perform with nearly as much activity as the horse.—S.

MEXICAN BEEF.

Butchering is a Ghastly and Brutal Performance.

EDITOR AMERICAN FARMER: When one refers to the rural districts in Mexico the term does not signify that these districts are truly rural, as we define the word. It is rather a misnomer. We leave the madding crowd of cities for rural retreats; that is, we seek rest for the eye and the wearied brain among the fields, the trees, the flowers. Not so is it in Mexico. The larger part of rural Mexico is to be found in its rugged mountains of rock and its plains of burning sand. There are cities, and there are rural settlements there. Those who exist in the small towns and villages in the interior are not to be envied for many reasons, a principal one of which is the great scarcity of nourishing food. The poorer classes are not upon a much lower gastronomic plane than their richer neighbors. The staple commodities year in and year out are corn, beans, dried-beef or jerked-beef, panocha (a brownish sugar), chile colorado and coffee. There the list ends. Rich and poor have the same unremitting, omnipresent diet. Occasionally a starving chicken is loosed from its bondage upon earth, and when a sufficient number of families can be found to club together, a steer or cow, or time-scarred veteran bull is purchased, and then, mercilessly—as we shall see—butchered to make a Mexican holiday, and, verily, it is a holiday. The Pueblo turns out en masse upon such an occasion. Wrinkled age hobbles on canes, less mature matrons head a procession of their progeny, babes in arms, young men and maidens, noisy and screeching children, are all there to witness the great event—sometimes a quarterly, sometimes a semi-annual occurrence—at all times a welcome pastime for all but the poor brute.

What is the process? It is this: The animal selected is brought to the place of killing 24 or 36 hours before the fatal knife releases him. A short rope is fastened about the horns, and this is attached to a stake firmly driven in among the rocks of a near arroyo, or in the ground on the plain. The merciful theory of these connoisseurs of the Pueblo is that an animal is made more succulent if deprived of food and water for 36 hours before killing. This is rather a convenient arrangement, as hay is a rare thing in such sections, and animals make this their sole diet, and are entirely ignorant of the article called mash, which their brothers and sisters in God's country are so familiar with.

Tied to this stake it becomes fevered, restless, and nearly wild, and in its struggle for freedom generally winds its short rope until its nose touches the ground. Still it is thus allowed to remain. Its eyes are bloodshot, its sides sunken, and it is a prey to the millions of flies which add to its agony. The morning for the execution arrives. At daybreak the crowd assembles. The cord is loosened, but a longer one has already been fastened to the horns. Believing itself free, it plunges and starts toward the stream for water, only to be suddenly brought up with a round turn by four or five stout men at the other end of the rope. And thus it is allowed to break and run, only to be hauled up again. Having gotten as much fun out of it as possible, encouraged by the wild plaudits of the crowd, the beast, panting and well-nigh dead, is thrown to the ground or upon the rough stones of the arroyo. Its feet are fastened together, the four making a huge bunch. Its head is thrown back, the horns resting against its vertebræ. This gives the butcher, now ready with glittering knife, which for an entire day he has been edging up, a fair opportunity for reaching the heart. But stay! Whence come these men and women, and boys and girls, and why? Well, they come with small dishes and ollas to catch the blood which directly will spurt from a gaping wound. This *morceau* they immediately take home and fry into something resembling in consistency a scrambled egg, and eagerly devour. Is the executioner ready? He is; arm bared and blade now reflecting the early sun. A huge piece of the flabby skin is cut from the neck, accompanied by a groan from the beast, the first evidence it has given that it still lives. Now a dart. The knife disappears and also a part of the man's hand, which turns the blade hither and thither in the heart. The groans of the beast are echoed and re-echoed about the hills, mingled with the chorus of shrieking, delighted witnesses not far away. The echoes die with the groans, and with a last wearied refrain, more like a sigh, the breath is gone; the white of the eyes turn heavenward, and he cruelty is successfully completed. But now comes the butcher's real task. The hide is quickly removed, and the meat, yet quivering with muscular contortions, is cut off in slabs of a size to suit the finances of purchasers who run home with it and quickly fry it, or cook it upon a stick over a few coals, and gratefully and hoggishly devour it. This is a scene repeated as frequently as money will admit of, and witnessing one is but to see the similar butchering in all the rural districts of our sister Republic.—S. G. Y.

"Kentucky's Futurity."

The Kentucky Trotting Horse Breeder's Association offer some fine prizes to be trotted for by youngsters in 1894 and 1895. The track is open to the world, and any mare that has foaled or is due to foal in 1892 is eligible, but she must have been nominated on or before March 15, 1892.

When the foals are two-year-olds they will trot for $5,000 of the main stake, and when three-year-olds trot for the remaining $20,000 or more.

In the two-year-old race $3,000 will go to the winner, $1,000 to second, $500 to third, and the nominator of the dam of the winner will get $500.

The three-year-old winner will receive $15,000, the second $3,000, the third $1,000, and $1,000 will go to the nominator of dam of winner.

Over 300,000 orange trees were planted in Mexico last year by planters from California.

THE GARDEN

Gleanings.

To grow onions after the new culture system, by which most satisfactory results have been obtained recently in New York State, the following are points of advantage:

1. Longer period of growth.
2. The making of the greater part of their growth early in the season, during the cool weather, before the others ordinarily grown had fairly started.
3. The transplanted onions were much more uniform in size than those grown from seed sown in the open ground.
4. Transplanted onions ripened earlier than the others, and yet had a longer time in which to grow before the hot weather came. The extra labor of transplanting was fully offset by the saving in the labor of weeding and thinning, and as the yield is greater from the transplanted crops, it follows that with transplanting onions can be grown at a less cost per bushel than those grown in the ordinary way.

That succulent vegetable, the tomato—once despised—is now the subject of great attention. The following is good advice in the treatment of the plant: Set out plants when six inches high and hill up well until the hight of a foot is reached. Train the branches apart. Throw around the plant wood ashes which will at once act as a fertilizer and a poison to bugs and disease. The roots will be thrown out by the hilling process and growth forced. The hill acts as a good bed for the fruit to rest on and prevents rot.

For growing tomatoes under glass the temperature should not be less than 60 degrees at night. When the plants are fruiting stable manure should be spread over the top soil, or liquid manure applied once a week. This class of gardening is rapidly enlarging and is very profitable. There is really no change in the treatment of the indoor plants than that applying to outdoor growth. Great care is necessary, however, in securing the proper temperature.

A farmer in Indiana says he don't believe in "sitting around the edges," but adds that a man on a farm must "be up early and often." For the last six years his annual sale of strawberries has been 1,200 bushels, and 480 bushels of blackberries were sold in '88 and '89. His market is a town of 12,000 inhabitants. It is barely possible that this town "sits around the edges" in the berry season and devours his crop.

It is claimed that as fine if not better result may be arrived at by sowing early cabbage in February and March than in the Fall and Winter. By working hot ashes in the soil the same will dry out and work fine. The plants will grow more stocky if the seed are sown thin, and a better-headed plant be secured. Soot or ashes sifted over the bed will drive out insect marauders.

The vineyard on a farm besides being a very popular resort of the family is also a very remunerative section. The early grape, of course, demands a good price and helps to enrich the grower. Even later in the season, at three cents per pound, an acre yielding three tons of grapes will yield $180. Small wonder, then, that farmers are devoting a large part of their land to grape culture.

To escape mildew, lettuce must be grown at a low temperature—35 degrees to 40 degrees at night and 50 degrees to 70 degrees during the day—with care to avoid sudden extremes of temperature. An abundance of plant-food and water must be used, the drainage should be good, the watering done in the morning and on bright days only.

The main features of the new potato culture are: The seed is so planted that under ordinary conditions it cannot help receiving the moisture necessary to germination; level culture, thus exposing the least possible surface of the soil to the action of the wind and sun, saving a portion of the moisture that under other conditions would be rapidly carried off.

Salt will make fertile soil if properly administered. Those farmers who have used mineral fertilizers, phosphates, for instance, for any length of time have in their soils a quantity of unusable, unfertile matter. An application of salt early in the season will accomplish as much for a year or two as the more costly fertilizer.

In Europe, grapevines are allowed less space than we give them in this country. Experience has taught that with more room and higher trellises the vines will be healthier, and a few of them thus planted will yield better fruit than a larger number closely planted. They need, like Americans, more "elbow room."

The Rural New Yorker, No. 2, a recent introduction to the potato world, is said to have claims to size as well as beauty. It is noticeable for its few shallow eyes, a pure white skin and flesh, and is a big yielder of tubers for the table. Only 48 of the Rural New Yorker can be accommodated in a bushel basket.

To successfully water cucumbers, melons, etc., place an ordinary three-inch tile in the center of each hill, with lower end four to six inches in ground. Fill tile with water, which will gradually be absorbed by the subsoil, and the upper earth will not be left in a condition to grow hard and crack.

Strawberry growers should look after their plants carefully immediately after a crop, as at this time they need special attention. Plants are weakened by excessive production and become susceptible to cold weather. To insure a healthy plant and prosperous for a succeeding season a little attention is obvious.

Notwithstanding the fact that fruit-growers in California, Oregon, and Washington claim their own the first, yet it is a fact that what the Western fruit gains in enormity of size it loses in quality of sweetness. It is so likewise with their flowers. They grow larger than their Eastern sisters, but they lack perfume.

This level culture allows of an equal wetting of the soil by rain; the water is not concentrated in a ditch between the rows, often below the bottom of the potato hill and drained off, but finds its way to the potato roots and supplies the necessary moisture.

Southampton County, Va., is breathing easier now since the introduction of *A Peanut Picker*, which is as great a labor saver as is the bean thrasher. A crop which has heretofore taken four months to pick was this season secured in seven days.

In Mexico the ignorant farmers of the interior who grow cauliflower eat only the green leaves surrounding the head. They throw the cauliflower itself away. Fortunately these ignorant folk raise but few of this delicious plant.

The English currant, or black currant, so popular in Great Britain is quite in demand on this side of the water at present. It is principally a preserving fruit; easily raised, and freer from the attacks of insects than the red currant.

The largest raisin vineyard in the world now bearing is owned by A. B. Butler, of Fresno, Cal. It contains 610 acres. The annual income from this vineyard has reached $200,000.

With Bordeaux mixture for fungus diseases, arsenical compounds for leaf-eating insects and oily ones for others, the successful cultivation of many more plants than before is now made possible.

Egg plants require early starting, warm quarters, vigorous plants, rather late transplanting to the field, warm, rich and moist soil, constant attention to potato beetles and frequent cultivation.

Some nurserymen now sell trees on the five-year plan; that is, the nurseryman is to receive choice of any two crops grown on the trees inside of five years in payment for the trees.

Winter radishes may be grown successfully indoors, in a warm window. Put in a shallow box in rich earth. They mature rapidly.

The peach season for '92 will, it is claimed, rival the prolific one of last year. Basket-makers are crowded with orders already.

A raspberry plant, if kept pruned, is good for 10 years' bearing.

POTATOES.

Their Care and Cultivation—The Best Way to Obtain Seed Potatoes.

EDITOR AMERICAN FARMER: The potato when first obtained from its native mountains was a small, watery, and even bitter tuber. By cultivation it has been brought into so high and refined a state that most of the countries of the civilized globe look at it as one of the most important articles of food. How has this great change been brought about? How has everyone who has planted the potato assisted in refining it? Generation after generation has adopted the same treatment which has wrought this change.

The natural place for potatoes is in the earth, but most of those which are used for planting are out of the ground from five to seven months in the year. When they are dug in the Fall we find them, if matured, when baked or boiled to be dry and mealy. They are generally put into cellars to remain until Spring. As warm weather approaches they are often removed to some outbuilding to remain several weeks, which renders them less fit to grow. Out of this outbuilding are selected the potatoes for seed.

Everyone who has ever noticed the difference between the flavor of a potato in the Fall when first dug, and one in Spring which has been kept in a large, dry cellar, has observed that the flavor becomes more impaired—much more so than those which are buried in holes in the earth, where they retain nearly all of their freshness and vitality. It has also been observed that farmers who have small and inconvenient cellars keep their potatoes in better condition than those who keep them in large, cool ones. Hence, by storing them in the latter and letting them wilt before planting, they become weakened in their nature and are subject to degeneracy and finally to disease.

In order to obtain good potatoes for seed, make choice of a small spot of arable land on which water will not stand—an eastern slope and new ground are the best—plowed early in the Spring and furrowed four or five inches deep, two and one-half feet apart. Select middling-sized potatoes which have touched the ground during the Winter previous, but do not cut them. Drop one every eight inches along the furrows and cover them by filling the furrows with earth. Then cover them with a top-dressing of forest leaves or straw two inches deep. As soon as the tops of the young plants are two inches high, pass between them with a shovel-plow, follow with a hoe destroying the weeds and leveling the ground; do not hill. This is all you have to do until Fall. When the ground begins to freeze cover with straw, chaff, or forest leaves, six inches deep, to keep them from frost. Your potatoes will now have a chance to ripen and rest during the Winter. In this way you will have the greatest yield and best quality. Continue this course from year to year and the rot will not only disappear, but your crop will increase from 25 to 100 per cent.—A. W. S., Maryland.

Bad Winter in Idaho.

This has been a terrible Winter for stock on the Idaho ranches. Thousands of animals are dead, and the stockmen say that owing to recent heavy snows there is no possible hope for the remainder.

Novel Way of Constructing a Tunnel.

Sir Edward Reed's plans for contructing a railroad across the British Channel is to lay two mammoth tubes of steel-plate and concrete 20 feet in diameter. The tubes would be made in lengths, and when two lengths were completed they would be joined together in a parallel 59 feet apart and floated out into the channel to be attached to the completed length. All the work is to be done above water. Thus the end of the completed tube is to be kept afloat until a fresh length is joined. Then that will be allowed to sink, and the last attached part will form the end of the completed part. This plan has already been practiced with success in America in carrying the pipe, 40 inches in diameter, for a water-works, a long distance across a body of salt water. In that case the engineer in charge invented a joint which remained tight as the complete tube first hung in a curve and afterward adjusted itself to the bottom on which it came to lie.

Texas planters are turning from cotton to horses.

Nestings.

If you give your poultry whole corn or wheat in the morning it would be better to warm it a few minutes. Grain becomes very cold when standing over night in a cold room, and in that condition is not healthy diet for poultry. All creatures are subject to indigestion, and cold food hastily eaten will affect even a fowl.

Some ostriches attain the age of 100 years. Imported breeders are worth from $600 to $1,000. Domestic birds bring $250, for five years of age; four years, $200; yearlings, $100; six months' chicks, $50. The eggs bring $15 per dozen. The older birds are good roadsters, and will travel at the rate of 26 miles per hour.

The following foods are said to contain all the elements that exist in eggs: Oats, wheat, barley, corn, bran, linseed, hempseed, rape-seed, crushed fresh bones, mustard-seed, green cabbage and clover, crushed limestone, crushed oyster shells, or something which will furnish carbonate of lime for making shells.

Now that the season of rains is at hand, look well to your floor in the poultry-house. If not properly drained there will, in the rainy days, be an accumulation of mud upon the floor. Hens will not thrive in mud. They despise wet feet also.

Fowls should not be crowded into narrow quarters at any time. Young fowls, at feeding time, have no show among older ones. The crowding leads to feather picking, to egg eating and general disease.

Keep hens and chickens tame, so that an unexpected call at the coop will not frighten them, and they will do better. A scared hen cannot pull herself together any quicker than can a frightened old maid.

If your chickens are of good size and thoroughly in condition, don't worry about the color of their feathers. They will command better prices on account of the merits named.

Farm poultry may be said to be doing very well if it averages 150 eggs to the hen per year. Some extra attention and a good range, a flock of Leghorns might produce 200 to the hen.

There is no economy in feeding poultry upon cheap diet, such, for instance, as wheat screenings. Good sound wheat is cheaper, or that which has been scorched or smoked in kiln drying.

Use skimmed milk and kerosene oil in equal parts for the "scaly leg" on poultry. Rub well in. This will destroy the insect which burrows beneath the scales.

By the intelligent use of incubator and brooder one may sell chickens for broilers nine out of the 12 months of the year.

Strong-flavored food will impart the same flavor to the eggs if given in large quantities.

Feed corn at night, if possible, as it is fattening and heating.

Ducks are less liable to disease than almost any other fowl.

A dust bath is necessary to the health of poultry.

CROW TACTICS.

The Way They Overcome Enemies and Secure Food.

I saw, early one morning, says a writer about India, a very curious contest between a number of crows and a bandicoot rat. The rat had obviously been out all night, and was making his way home along a shallow, open drain, when the crows caught sight of him. He was a sorry specimen of his kind, mangy and decrepit, so the crows "went for him." A bandicoot's teeth are long and sharp, and the birds were not inclined to come to close quarters in the open. They formed up in single file on either edge of the drain, and escorted the now hurrying rat till he reached his hole. Then they began operations. The instant the bandicoot's head disappeared they fell upon him pell-mell, and drove their iron bills into every tender spot they could reach, while one of the flock held on to his tail, seemingly bent on dragging the owner out. Whether the strain on his caudal appendage overcame him, or whether prompted by motives of vengeance, I cannot say, but after a few seconds' struggle the bandicoot backed out and snapped fiercely at his foes, who retreated a step or two and waited. The crow at his tail was the first to retire; and, giving it a defiant waggle, to make sure it was free, the rat made another rush for his burrow. The very moment his head was out of sight a crow pounced upon his tail again, and the others resumed the attack, drawing blood at every peck. I began to understand the modus operandi, and grew interested; the crows' plan of action, in detail, was to assault only when the rat could not bite back, and the general idea to worry him until he succumbed to exhaustion and weakness. It took the birds just 12 minutes to achieve a victory; the bandicoot grew weary, and presently the crows confined themselves to simply dragging him out whenever he got half-way into his hole. As soon as it appeared safe, they pounced upon him en masse, pecked out his eyes, and literally stabbed him to death. Then, in half the time it had taken to kill him, they ate him and flew away happy.

If you see half a dozen crows standing silently in a circle on the road in India, you may be sure there is a scorpion in the middle lashing out on all sides with that dangerous curved spur which forms the extremity of his tail. Stand still and watch the one-sided strife. One crow takes his place in front of the reptile, to engage his attention; the rest hop round, seizing every opportunity of giving the ever-moving tail a vicious dig. The scorpion is scaly and tough, and surprisingly active, so it takes some time to disarm him; but his strokes grow fainter and fewer, and the crows' digs harder and more frequent. At last a well-aimed peck strikes home between the overlapping armor, and the tail is severed; it's all over. As the spur and its underlying sac of poison fall off every beak closes on some portion of the scorpion's anatomy, and a tug of war ensues, "all against all." It is torn to pieces and swallowed on the spot.

THE GREAT AMERICAN DESERT.

One of the Strange Corners of Our Country.

The great American desert was almost better known a generation ago than it is to-day. Then thousands of the hardy Argonauts on their way to California had traversed that fearful waste on foot with their dawdling ox teams, and hundreds of them left their bones to bleach in that thirsty land. The survivors of those deadly journeys had a very vivid idea of what that desert was, but now that we can roll across it in less than a day in Pullman palace cars its real—and still existing—horrors are largely forgotten. I have walked its hideous length alone and wounded, and realized something more of it from that than a great many railroad journeys across it have told me. Now every transcontinental railroad crosses the great desert which stretches up and down the continent, west of the Rocky Mountains, for nearly 2,000 miles. The northern routes cut its least terrible parts, but the two railroads which traverse its southern half—the Atlantic & Pacific Railroad and the Southern Pacific—pierce some of its grimmest recesses.

The first scientific exploration of this region was Lieut. Wheeler's United States survey, about 1850, and he was first to give scientific assurance that we had here a desert as absolute as the Sahara. If its parched sands could speak their record what a story they might tell of sufferings and death; of slow-plodding caravans, whose patient oxen lifted their feet ceaselessly from the blistering gravel; of drawn human faces that peered at some lying image of a placid lake, and toiled frantically on to sink at last, hopeless and strengthless, in the hot dust which the mirage had painted with the hues and the very waves of water.

No one will ever know how many have yielded to the long sleep in that inhospitable land. Not a year passes, even now, without record of many dying upon that desert and of many more who wander back in a delirium of thirst. Even people at the railroad station sometimes rove off, lured by the strange fascination of the desert and never come back; and of the adventurous miners who seek to probe the golden secrets of those barren and strange-hued ranges there are countless victims.

A desert is not necessarily an endless, level waste of burning sand. The great American desert is full of strange, burnt, ragged mountain ranges, with deceptive, sloping, broad valleys between, though as we near its southern end the mountains become somewhat less numerous and the sandy wastes more prominent. There are many extinct volcanoes upon it, and hundreds of square miles of black, bristling lava flows. A large part of it is sparsely clothed with the hardy greasewood, but in places not a plant of any sort breaks the surface, as far as the eye can reach. The Summer heat is unbearable, often reaching 136 degrees in the shade, and a piece of metal which has been in the sun can no more be handled than can a red-hot stove. Even in Winter the mid-day heat is insufferable, while at night ice frequently forms on the water tanks. The daily range of temperature there is said to be the greatest ever recorded anywhere, and a change of 80 degrees in a few hours is not rare.—*St. Nicholas.*

Catarrh.

People who are subject to catarrhal ailments have special need to be particular in regard to their feet covering; they should see to it that their feet are comfortably clad, their shoes should have substantial soles and should come well up the ankles, and not be laced or buttoned tight. Light merino stockings or half-hose may be sufficient for warmth, but whenever by reason of much exercise the feet have become damp, and especially if the leather has absorbed wet, it is wise for a change to be made in both stockings and shoes.—*Hall's Journal of Health.*

Born, Not Made.

The farmer, like great and successful men in other walks of life, is born, not made. The cry that "farming don't pay" is generally the refrain which comes from the made farmer. The born farmer looks after and ferrets out the small leakages, and the farm is more susceptible to this drain than most other enterprises, and only the born farmer knows where to look for the leaks.

Sight and Smoking.

One peculiar trait of persons who are blind is that there are scarcely any smokers among them. Soldiers and sailors who lose their sight while in action sometimes continue to smoke for a short time after that great calamity overtakes them, but as a rule they soon give up the habit altogether.

A Russian Rancher.

Gustave Jovanovitch, the greatest cattle breeder in Russia, and called the "King of the Steppes," owns 600,000 acres of land and posseses more than 1,000,000 sheep and 34,000 shepherd dogs.

Japan's population of 41,000,000 souls lives on 18.000.000 acres.

THE ORCHARD.

Pickings.

Fruit-growers may cut this remark out and ponder over it: It is authoritatively stated "not only does the climate of each State differ from the adjoining one, but each town, and, in fact, each farm has a peculiar climate to itself." The orchard planted upon an elevation that it may escape the blighting effects of an untimely frost when the fruit is in embryo formation, or when at the point of blossoming, may reward the owner with an abundant crop. Contrariwise, his neighbor whose orchard is so located that it receives the full force of the destroying element may secure no crop whatever. The character of the soil enters largely into the success of the orchard.

The Wealthy apple is a good fruit, and its perfect hardiness makes it a favorite in northern localities where many other varieties do not succeed, but when taken farther south there has been complaint of the fruit dropping early. It is said that this may be prevented to a great extent by planting the trees upon the northern slope of the hill, or on the northern side of other trees that will shade it, and then thinning out the fruit so that those left will have a chance to make a better growth.—*New England Farmer.*

The apple, which was given a boom by Father Adam, and has been handed down from generation to generation, is attracting more attention at present than ever before, principally from the farmer. In 1886 American and Colonial growers sent to England 330,000 more bushels of apples than in 1885, and to-day the American farmer is increasing the capacity of his orchards for production of this fruit for the English market.

When a fruit tree becomes wayward, *i. e.*, when it has attained the age to bear fruit but manifests a disposition to go wild by throwing out vigorous branches, root pruning will be found efficacious in starting it properly upon its mission. If done in August, the supply of sap will be materially reduced, the tree will become stronger and fruit buds will form.

Orchards planted in low, flat land are more productive, and attain greater maturity, than if planted upon high ground. The trees should be planted deep, and the ground between the rows higher than that immediately around the trees. Cultivation will gradually work the high ground toward the trees and protect their roots.

A Surgeon is always slow to sacrifice a human limb, and never does unless the life of the patient is at stake. This should teach the farmer to study the case of the trees in his orchard before he begins to amputate the limbs thereof. Don't cut off twice before you think once.

Test the purity of chemicals before using as spray for trees, as in the case of sulphate or carbonate of copper. Sulphate of copper should dissolve readily in warm water, leaving no sediment. Carbonate of copper dissolves completely in pure nitric acid.

Seckel pear trees need much manure. The fruit must be carefully thinned if fine specimens are desirable.

Get ready for Arbor Day. It is not too early to begin your preparations for this beautiful celebration.

A cherry orchard may be made successful by tillage. Experience proves this to be the better plan.

At the Wellhouse orchard in Kansas the yield of apples for 1890 on 225 acres was 79,179 bushels.

From 100 to 200 tons of American apples are daily exchanged by brokers in Liverpool.

Crops in Orchards.

Nothing is made by trying to grow farm crops of any kind in orchards. All the small grains are very injurious to the growth of trees, and should only be tolerated when it is desired to check growth and promote fruit bearing. The hoed crops do not do much injury, but the trees make cultivation more expensive, and diminish the crops so much that they do not pay. They besides threaten injury to young trees by barking the trunks during the season of cultivation. Do not plant more orchard than you can spare from cropping, is the safe rule for profit.—*American Cultivator.*

An Old Pear Tree.

On the once-famous Orchard Farm in Massachusetts stands a pear tree which was planted in 1630 by Gov. Endicott. The old tree, a mere shell, with apparently all its inner integuments gone—nothing but the outer bark remaining, and the substance of that split in twain—still stands and renews again its vernal beauty in a wonderful display of blossoms. But though its blossoms are fair, its fruit is said to be gnarly and bitter. The tree appears to give promise of rounding out three centuries of life.

Proper Way to Prune.

Proper pruning is done altogether with one's thumb and forefinger, *i. e.*, to remove all surplus twigs and shoots as soon as they appear, and thus prevent the waste of sap in building up worthless wood, says *Orange Judd Farmer.* Many orchardists, otherwise intelligent, utterly neglect trimming trees, or else do it in a very imperfect way. As a result, much of their fruit is small and partly colored. Also the labor of picking the fruit from an unprepared tree is about twice what it should be, as the head of the tree becomes so thick and tangled. Open up the head by cutting out every branch that crosses or otherwise interferes with another, and the benefit will be twofold. The sun and the air will be admitted to aid in the growth of large handsome fruit, to harvest which will be comparatively easy work and a real pleasure. The grapevine is, perhaps, more neglected than the apple tree. If given its "own sweet will," it will cover everything within reach.

TREE PLANTING.

Depth, Pruning, Setting, and Care.

[By Prof. T. L. Brunk, of the Maryland Experiment Station.]

1. As to depth to plant: My tests this year go to prove that those planted but six inches deep, or the depth of an ordinary plow furrow, gave the best top growth and the finest root growth. Those set almost on top of the ground did next best. Those set 18 inches deep turned their feeble young roots upward, and young roots were formed only at the tip ends of the old roots. I usually say at meetings, in preparing to plant trees, simply plow the whole field as for corn. Then lay it off in squares with the same plow by plowing a single shallow furrow the first way where a row is to stand simply for a mark. It should be straight or nearly so. Then, in crossing, plow a double furrow where each row is to stand, throwing the soil each way. At the crosses the tree can be set without digging any more of a hole than the plow made.

2. The main thing to do with a tree before planting is to prune off the roots till only about three inches long. The fibrous roots are of no use, as most of them die because the larger ones (as larger limbs do) rob them, or rather outgrow them, and hence take up all the food supply. By root-pruning a set of new roots are formed that strike into the ground at angles peculiar to the needs of the tree—some at 45°, some nearly horizontal, and others nearly perpendicular to the surface. This, I believe, to be a great discovery. With apples and pears the trees will make a larger growth and more even growth than those with roots unpruned. This was the result of comparison this past season on nearly 500 trees. In setting such trees there is no time wasted in fixing and fussing about the roots to get every space filled with dirt. There is no need of a wide hole; the plow does the hole digging.

The next important pruning before setting is that the whole top must be cut off to within two feet of the surface for apples and plums, about 16 inches for peaches, and 12 inches for pears. The plums and peaches must be one season from bud, but the apple and pear may be three or four years old; better, however, only one season also from bud. This gives us a mere branchless stub with some few short prongs of roots as the tree to plant. There is no need of staking such trees. The wind will not likely reach them. If set in Fall, hill up the soil about them some so they cannot be heaved out by frost. Best in Northern States to set in Spring.

3. The only requisite in planting that is important is to tramp the soil close to the roots. After the ground is checked out, as told above, and the trees have been pruned in a barn, as indicated, and loaded on a wagon with a deep box and some wet straw thrown over them, one man, with a team that will start and stop by word, should be able to set 25 trees in ten minutes, and do it right. A half dozen could be taken from the wagon at once and will not dry in five minutes to do any harm. In fact, trees in a dormant state have been known to grow after lying out in the sun a day.

For my methods of tree treatment, I have about 600 trees growing on our Station grounds as evidence, and besides I know of and have seen several orchards that have been planted out in this way.

All trees planted in this way must have good culture, especially the first season. About five or six plowing or cultures. I never allow the surface to bake and the moisture to escape.—*Connecticut Farmer.*

The ant is said to have the biggest brain according to its size of any creature.

Mistletoe on Apple Trees.

Ivy has been acquitted by science of the charge of nourishing itself at the expense of the tree it clings to, but something more than a suspicion in this regard still popularly attaches to the mistletoe. First, no doubt, because it is classed among "parasites," and next, because, unlike the ivy, it has no roots in the ground. At last, however, the mistletoe's turn to be vindicated has come. The case against this once-venerated and still-cherished plant has, according to the *Gardiners' Chronicle,* been growing weaker since the discovery of the principle known to the learned as "symbiosis," or that admirable arrangement of nature whereby two plants live in intimate association without injury to either, and even with reciprocal advantage. In the light of this new doctrine, it has been suspected that an apple tree (the mistletoe seems to have left off growing on oaks since the days of the Druids) renders services to the mistletoe growing on it in Summer, while in the Winter the evergreen's viscum or glutinous juice supplies the deficiency which the apple tree experiences through the loss of its leaves.

Practical Science.

An Austrian chemist is reported to have solved the problem of waterproofing leather by a cheap and efficient method. He employs a solution of 15 parts of gelatine and five parts of bichromate of potash dissolved in 1,200 parts of water. Impregnating the leather with this solution causes the albumen to coagulate in the pores.

Experiments have been made in burning brick with kerosene oil instead of wood, and it is demonstrated that the oil is over one-third cheaper. The trouble seems to be to properly regulate and distribute the heat—the oil giving such a hot fire.

Air plows, V-shaped, are to be placed before the locomotives of the fast express trains of one of the English railroads. It is expected that greater speed will be obtained by overcoming much of the resistance of the air in front of the train.

When Portland cement is mixed with water and used in an atmosphere below the freezing point it will set, but rapidly disintegrates. It has recently been found that the mixing of a small amount of caustic soda will overcome this difficulty.

It has been found that sandstone as an engine foundation is far from perfect. The stone soon becomes saturated with oil, making it soft and easily friable.

A street in Germany has been paved with indiarubber, with satisfactory results. It is said to be more durable than asphalt and less slippery.

A Long Train.

If all the locomotives in the United States were coupled together they would make a train of solid iron and steel over 300 miles long. Add the passenger-cars and we would have 300 miles more of wood and iron; this would give us a gigantic passenger-train 600 miles in length, counting both engines and cars.

Colorado's "pay dirt" last year in gold, silver, copper, and lead amounted to $33,548,934. Her smelter's product amounted to $44,919,193.

SWINE.

Pen Notes.

It is said by ex-Gov. Hoard, of Wisconsin, that a pig will grow to 50 pounds for 50 pounds of food consumed. The next 50 pounds will call for 100 pounds of food, and when it turns the beam at 300 pounds, 6 pounds of feed will produce 1 pound of pork. In order to make a profit the pig should be killed before it reaches the 300-pound weight.

Give your pigs plenty of clear, pure water to drink. Run it into the troughs as often as possible. The diet of the animal often tends to thirstiness and if fed upon kitchen refuse the greater the need of pure water, such food being abundantly saline. The idea that pigs do not enjoy fresh water equally with other stock is erroneous.

The following is a good mixture for breeding sows and pigs growing: Ten pounds of meal of mixed grain, 15 pounds wheat bran. For a brood sow the addition of a quart of cut and boiled clover hay will be nourishing. One-quarter pound of oil meal given after farrowing and mixed into the feed will help build up the sow.

Two hogs were selected recently by a stock-raiser. They were of the same size, weight, age, and thrift, and to one he gave an ounce of salt daily, and none to the other. In three months the salted one weighed 50 pounds heavier than its companion. It is not stated that one ate more than the other.

In the Winter season when pigs are under cover they should be treated occasionally to wood ashes. These ashes contain elements which the animals find in the woods when turned out, and a weekly ration will be found very beneficial. It is at once an appetizer and an aid to digestion.

Adam Clarke, at a dinner given in his honor, at which the central piece *de resistance* was a roast pig, when called upon to ask a blessing, invoked as follows: "Oh, Lord, if thou canst bless under the gospel, what thou didst curse under the law, then be pleased to bless this pig."

Feeding floors for swine should be arranged so as to prevent an admixture of corn and filth. It is neither palatable to the hog nor conducive to good pork.

Do not select for good breeders the offspring of young sows. They are better fitted for fattening for the market. The offspring of old sows make the best breeders.

The educated hog which so deftly played at cards must now take a rear seat. A goose has been discovered which sings contralto.

Every needful thing should be at hand, and perfect cleanliness on all sides, before you begin to kill hogs.

Between Nov. 1 and Jan. 1, the pork-packing business of the West was 3,395,000 head.

The bodies of hogs just killed should not be allowed to lie long after scraping. Hang up at once.

Swine need shelter, shade, and care in Summer, even as in Winter.

Look After the Sows.

There ought to be sows to farrow soon, as pigs dropped in February or March can easily be fattened for Fall killing and will attain a desirable size. See that they have warm beds and plenty of bedding. The straw should be cut for them a few days before the pigs are expected, as often they become so entangled in long straw as to be unable to get around to the mother, even if she does not lie on them. Young sows that have not had pigs before need watching, as they are often so restless as to endanger the lives of the pigs unless they are taken away until she has become quiet. If they have been properly handled and kept tame, so that they will allow an attendant in the pen, the advantage of it will be seen now. After farrowing, feed the sow very lightly for a few days. A warm mash of bran and water, or with a little skimmed milk, is better than heartier food, but after the pigs are a week old there is but little danger.—*American Cultivator.*

SOILS AND SUNSHINE.

It is Not Only Necessary to Consider Manures, but Climate Also.

EDITOR AMERICAN FARMER: Of all classes in society farmers are most unprogressive. They are too much disposed to follow old methods of cultivation, manuring, and the kinds of crops they raise. They ignore the fact that whilst a certain soil may grow a given crop with the usual environments of temperature and rainfall at a mere margin of profit, yet that there may be others that will yield abundantly, and hence at a large profit.

The question with all should be how to arrive at this. Prof. Hilgard, of California, gives a practical answer. There are certain trees that a virgin soil produces adapted to the temperature and rainfall of the seasons. This soil, when cultivated, grows some crops abundantly, others indifferently, and some very poorly. An analysis of this soil shows the universal presence of certain well-known substances, and hence wherever these are found we know that certain crops will grow.

Now, this soil may have been long cropped, no manures applied, and in consequence run down so that it will produce little or not at all. Hence, to restore its fertility at the least cost and in the shortest time, shall we then apply a complete manure at a high cost to enable us to grow any of the old crops raised there? Certainly not. Looking over the crops usually grown, it is not impossible to find that some one element, potash, phosphoric acid, or nitrogen, has not been so heavily drawn on as the others; if so, is it not possible to find a crop that will grow there and require more of the abundant ingredient? It may be possible, nay, is probable, that we make more of one kind of manure than another, say cow, and then the bulk of our crops should be arranged to suit it; or, if our season and soil does not suit the crop best adapted to it, then, by the addition of chemical substances or of commercial fertilizers, we must add the missing ingredient. In this science has vastly benefited us.

But still there is necessity, and an urgent one, that crops be studied as to soil, light, heat, and moisture, as well as manures. Sands and clays do not require the same amount of sunshine; certainly not of heat and moisture. Thus in Princess Anne County, Md., the average number of cloudy days during the growing season—May to September—for some 20 years, is 17.7 per month. This would indicate crops requiring but a moderate degree of sunshine.—H.

THE CACTI.

Why they Have Spines and Other Repellant Devices.

The reason for this bellicose disposition on the part of the cactuses is a tolerably easy one to guess. Fodder is rare in the desert. The starving herbivores that find themselves from time to time belated on the confines of such thirsty regions would seize with avidity upon any succulent plant which offered them food and drink at once in their last extremity. Fancy the joy with which a lost caravan, dying of hunger and thirst in the byways of Sahara, would hail a great bed of melons, cucumbers, and lettuce! Needless to say, however, under such circumstances melon, cucumber, and lettuce would soon be exterminated; they would be promptly eaten up at discretion without leaving a descendant to represent them in the second generation. In the ceaseless war between herbivore and plant which is waged every day, and all day long the whole world over with far greater persistence than the war between carnivore and prey, only those species of plant can survive in such exposed situations which happen to develop spines, thorns, or prickles as a means of defense against the mouths of hungry and desperate assailants.

Nor is this so difficult a bit of evolution as it looks at first sight. Almost all plants are more or less covered with hairs, and it needs but a slight thickening at the base, a slight woody deposit at the point, to turn them forthwith into the stout prickles of the rose or the bramble. Most leaves are more or less pointed at the end or at the summits of the lobes, and it needs but a slight intensification of this pointed tendency to produce forthwith the sharp defensive foliage of gorse, thistles, and holly. Often one can see all the intermediate stages still surviving under one's very eyes. The thistles themselves, for example, vary from soft and unarmed species which hant out-of-the-way spots beyond the reach of browsing herbivores, to such trebly-mailed types as that enemy of the agricultural interest, the creeping thistle, in which the leaves continue themselves as prickly wings down every side of the stem, so that the whole plant is amply clad from head to foot in a defensive coat of fierce and bristling spearheads. There is a common little English meadow weed—the restharrow—which in rich and uncropped fields produces no defensive armor of any sort; but on the much-browsed-over commons and in similar exposed spots, where only gorse and blackthorn stand a chance for their lives against the cows and donkeys, it has developed a protected variety in which some of the branches grow abortive, and end abruptly in stout spines like a hawthorn's.—*Grant Allen in Longman's Magazine.*

TILLAGE AND TILLAGE TOOLS.

Conclusions as to Plowing, Harrowing, and the Effect of Cultivation on Different Soils.

Prof. Sanborn, of the Utah Experiment Station, has been engaged for sometime in a series of experiments designed to show the amount of power required to draw plows and harrows, and the character of the work done, as well as their effects upon soils and their cultivation. His conclusions are thus summarized:

1. The plow has little influence on the adhesion and looseness of the soil.

2. Lap furrows for heavy soils and flat-pressed furrows for light soils are the best.

3. A narrow, erect furrow for wet land and a broad furrow for other weather.

4. Tilled areas dried out faster than untilled ones.

5. Tillage restrains evaporation.

6. Less force is required to fit a given surface area for crops when the harrow is used.

7. The harrow is the true implement for "fining" and loosening the soil, the plowing serving to fit the soil for its action.

8. When ease of draft, depth of cutting, evenness of bottom or of the top of the unstirred soil and looseness of soil are considered, the cutaway type of harrow is the best. Those with square ends compress the soil somewhat and do not leave as smooth a surface at the bottom.

9. Deep tillage does not preserve the moisture of the soil equally well as shallow.

10. Except upon grass ground it is not improbable that the harrow, somewhat modified, may grow in importance when compared with the plow, unless the plow becomes modified for special soils.

11. Trucks under the end of the beam lessen draft and add to the uniformity of furrow and decrease the work of the plowman.

12. A three-wheeled sulley plow having no pole, the third running in the furrow and allowing of a shorter land side, gave a light draft and excellent work.

13. Draft decreased with depth, and probably will as long as the soil retains the essential physical conditions of the surface.

14. Wagons run lighter when team is attached to the higher wheels and when these have a half inch play on the axles.

15. The draft of mowing machines seems to follow speed.

16. A 6-foot cutter bar drew easier per foot than a 4½-foot cutter, and at a draft less than a plow carrying an average furrow; therefore, a pair of horses can draw a 6-foot cutter bar.

17. A pitman box set tight gave a less draft than one run quite loosely.

18. A heavy loss (7.6 per cent.) of force was observed when the truck at the end of the cutter bar failed to roll.

19. The draft of machines varied with the point of attachment for draft.

Testing Flour.

It is by the thumb the miller tests the character and qualities of the grain he grinds; spreading the sample over the fingers by a peculiar movement of the thumb, he gages its value by the thumb itself.

FREE PASSES.

The Interstate Commerce Commission Decides Against Favored Persons.

It is quite generally known that early in its history the Grange took up the important transportation question, not to fight or break down corporations, but to protect the people against the evils of monopoly. The Grange platform, or "Declaration of Purposes," has always said: "We are not enemies of railroads, navigable and irrigating canals, nor of any corporation that will advance our industrial interests, nor of any laboring classes.

"We are opposed to such spirit and management of any corporation or enterprise as tends to oppress the people and rob them of their just profits. We are not enemies to capital, but we oppose the tyranny of monopolies."

Acting upon the above principles so plainly laid down, the Grange, after several years of contest, secured the passage of the Interstate Commerce law, with its many good provisions, to protect the people. The law has been made as obnoxious as possible to the people by the railroads, but it means well, and is to a large extent doing the good work intended by its passage.

The evil of free passes was looked after in the law, and a late decision of the Commission is full of interest:

The Interstate Commerce Commission has had under consideration for a long while the matter of free passes issued by the various railroads doing an interstate traffic to certain favored classes. Whether the roads have the right under the act to regulate commerce, to let certain people ride gratis while the bulk of the passengers have to pay for transportation, is the rather delicate question the Commission has been called on to decide. Not long since the Boston & Maine Railroad Company was asked by the Interstate Commerce Commision to state its practice in regard to furnishing free rides.

The company, in its answer, stated that it was in the habit of giving passes as a business feature of its administration to numerous classes of persons, which it specified in the answer as follows:

Class 1 includes sick, necessitous, or indigent persons—in short, all cases of charity strictly.

Class 2 includes gentlemen, like Hon. James W. Bradbury, long eminent in the public service.

Class 3 includes proprietors of Summer hotels and large boarding-houses, conformably to a practice which has long existed among all the railroads of New England.

Class 4 includes wives of employes and other immediate members of employes' families.

Class 5 includes all agents of ice companies and all milk contractors doing business on the line of the Boston & Maine Railroad, or any part thereof extending between any two States; said agents and contractors traveling on the trains in the conduct of their business.

Class 6 includes the higher officers of State in the States of Maine, New Hampshire, Vermont, and Massachusetts, and certain prominent officers of the United States, like collectors of customs.

Class 7 includes the Railroad Commissioners of each of the States of Maine, New Hampshire, Vermont, and Massachusetts.

Class 8 includes the members of the Railroad Committee for the time being of the Legislatures of each of the States of Maine, New Hampshire, Vermont, and Massachusetts.

Class 9 includes persons who are trustees under mortgages on the property of the corporation, and who are entitled to inspect its property by virtue of the deed or indenture constituting them trustees.

Class 10 in the schedules annexed called complimentary, includes persons whose good will is important to the corporation, and who, so long as the general practice of railroads remains what it now is, might justly take offense if in the matter of free transportation they were to receive from the Boston & Maine Railroad different treatment from that received from other railroad corporations.

This concession imposed upon the Commission the duty of giving construction to the act to regulate commerce in respect to the right of a railroad company to give interstate passes to such classes of persons. The Commission met the question squarely, and in a convincing opinion discussed the statute and cited authorities at some length, and concluded that branch of the case in these words:

Without further citation of authority, the construction we give to section 2 of the act to regulate commerce is that where the service of the carrier subject to the act is like and contemporaneous for different passengers, the charge to one of a greater or less compensation than to another constitutes unjust discrimination, and is unlawful, unless the charge of such greater or less compensation is allowed and the exceptions provided in section 22; and that where the traffic is under substantially similar circumstances and conditions in other respects, it is not rendered dissimilar within the meaning of the statute by the fact that such passengers hold unlike, or, as sometimes termed, unequal, official, social, or business positions, or belong to different classes as they ordinarily exist in a community, or are arbitrarily created by the carrier.

This would exclude the right to give interstate passes to certain classes specified in the answer, which included "gentlemen eminent in the public service," "higher officers of States," "prominent officers of the United States," "members of railroad legislative committees," and "persons whose good will is important to the corporation."

That shuts off five classes very important, *sometimes*, for the corporations to have on their side. Now, if every State had an anti-free pass law, well enforced, covering just these five classes, how much "favorable" legislation to corporations would be headed off, and how much easier would it be for the people of those States to get many laws passed that are now defeated because of these free-pass gentlemen.

The Interstate Commerce Commission stated that they would decide upon the other classes named in the future.

And so organized farmers are helping themselves and others as well. The great wonder is that all farmers do not unite with their neighbors in the Grange and help along this good work, and in many other ways protect and advance their interests.—MORTIMER WHITEHEAD, Lecturer National Grange, Washington, D. C.

MARCH CROP REPORT.

Interesting Facts Made Known by the Agricultural Department.

The March report of the distribution of wheat and corn, by the Statistician of the Department of Agriculture, makes the stock of wheat in growers' hands 171,000,000 bushels, or 28 per cent. of the crop; 63,000,000 bushels of Spring wheat and 18,000,000 bushels of Winter wheat, much of the latter in States which have practically no commercial distribution, but entering into local consumption for bread and seed. This is the largest reserve ever reported, that of the largest previous crop (of 1884) being 169,000,000 bushels.

The exports from July 1 to March 1 were 164,000,000 bushels; the Fall seed, 36,000,000 bushels; the consumption, apparently, 200,000,000 bushels, but a larger proportion is taken for consumption in the Fall and Winter, and the actual consumption is proportionally greater than in the Spring and Summer.

The assumed consumption from March 1, 1891, to March 1, 1892, is 300,000,000 bushels for a population of 64,300,000; the exports 206,000,000 bushels; the seed 56,000,000 bushels, a distribution of 562,000,000 bushels.

The average weight of wheat is 58.5 pounds per measured bushel, which is the estimated weight of the crop of 1887, and is nine-tenths of a pound above the average of eight previous years.

The estimated quantity of corn in farmers' hands is 860,000,000 bushels, or 41.8 per cent. of the crop. This is the largest proportion ever reported, that of 1889 excepted, which was 45.9 per cent., or 970,000,000 bushels. The seven principal States have a surplus of 546,000,000 bushels, or 41.5 per cent. of their products, against 66.7 from the great crop of 1889.

The proportionable merchantable, the largest ever reported, 88.5 per cent., against 85.7 two years ago. The average of eight previous crops is 82 per cent., and the lowest average, 60 for the frosted crop of 1883. The present average farm price of merchantable corn is 39.2 cents per bushels; of unmerchantable, 25.7 cents.

Straws.

The manufacture of wines has increased about 1,000 per cent. in California during the past 10 years.

Thomas A. Edison was 45 years of age Thursday, Feb. 11. He says that he feels little older than when he became of age.

By a recent appliance to kitchen ranges the refuse from the kitchen is thoroughly dried, converted into charcoal and used.

NICKEL SILVER TABLE WARE.

We have secured, for the benefit of our subscribers only, a line of Table Ware which for style and beauty cannot be surpassed at less than double the price elsewhere. It is a new thing, also, and most of our readers have, beyond doubt, never seen a specimen of it. It is called nickel-silver, and is a compound metal intended to take the place of the old-fashioned German silver. In place of the brassy look of the German silver it has a slight steely tint, by which alone it may be told from pure silver. It is very hard and very strong, at the same time of light weight. It takes a higher polish than silver, which it will retain until worn out. It is the same material clear through, there being no plate of one metal upon a base or core of another. It is 21 per cent. of pure nickel. Being too hard to stamp, they are cast and polished in the plain tip pattern. This is the pattern in which the old-fashioned Sterling spoon was made, and is familiar to all. Owing to the strength and high quality of the metal, they can be made with more slender handles than the plated ware, and for this reason the model of the Sterling silver spoon has been adapted to it We are confident this ware will please our patrons, as it can be polished or scoured as much as occasion requires, and the same care is not necessary in handling it in the dish-pan as with plated silver.

A set of six tablespoons will be sent, postpaid, to any subscriber for $1.35
A set of six dessert spoons for 1.15
A set of six teaspoons for 80
A set of six forks for 1.35
A set of six dessert forks for 1.15

These sets all comprise six pieces. By the dozen they cost just twice as much as by the set of six. We will send as a free gift a set of teaspoons and tablespoons to anyone who will send us a Club of 6 yearly subscribers at $1 each.

Or a set of teaspoons, tablespoons, and medium forks for a Club of 10 yearly subscribers at $1 each.

Or a set of teaspoons, tablespoons, medium forks, and dessert forks for a Club of 13 yearly subscribers at $1 each.

Or a set of teaspoons, tablespoons, dessert spoons, and medium forks, for a Club of 13 yearly subscribers at $1 each.

Or a set of each of the five articles for a Club of 10 yearly subscribers at $1 each, and $1.50 added money.

Any housewife who will order a set of this ware may rest assured that she will be the envy of her neighbors. Address

THE AMERICAN FARMER CO.,
Washington, D. C.

FARMERS' ALARM CLOCK.

It Will Call the Boys to Make the Fires at any Hour Set.

This Clock is made specially for us by the largest manufacturers in the world.

It is warranted to be an accurate timekeeper, and is well made and perfectly finished in every particular.

It is in polished nickel case. The alarm bell sounds loud enough to arouse every sleeper in the house at the hour it has been set.

The clock runs 30 hours after winding.

The dial is four inches in diameter.

We give this Clock free as a premium for a club of 4 subscribers, with only 10 cents in money to help pay packing and transportation.

For sale at $1.45, with 10 cents additional if you want it registered.

Address

THE AMERICAN FARMER CO.,
Washington, D. C.

A CHILD'S SILVER TABLE SET.

No. 301.

This is something fresh from the factory, manufactured specially for our trade. The cut is very much reduced in size, and does not do the articles justice. It is not a toy set, but for a child's use at the table. It is the proper size for a child from the time it is able to sit at the table until it is about 12 years old. There is a knife, fork, spoon, cup, and napkin-ring.

They are manufacted of American Sterling, covered with a triple plate of pure silver. These articles are as good for practical purposes as though made of pure silver clear through. They will never wear brassy, but will always retain the bright white color of silver, all the metal in them being of the same tint. The articles are neatly packed in a beautiful silk-lined plush box. We offer these five pieces, boxed and postpaid, at a price less than that charged for the box alone by the leading silversmiths of New York City.

For sale with THE AMERICAN FARMER for one year for.....$1 60

This will be sent free to any address, postpaid, for a club of four yearly subscribers at $1 each. Here is a chance for our young folks to secure a present for the little brother or sister absolutely free of cost.

Address

THE AMERICAN FARMER CO.,
Washington, D. C.

THE MARKETS.

NEW YORK, TUESDAY, March 15, 1892.

FLOUR AND MEAL.—Extreme dullness was noted throughout in wheat flour, receivers generally complaining of the utter lack of interest on the part of buyers, especially of lines which were offered with increased urgency and bids invited, but such bids as were mentioned proved too low and unsatisfactory for successful negotiations. The bulk of the dealings were in small jobbing orders. Export call very tame. Of the sales were 1,050 sacks and bbls low extras within the range of $3@$3.75, chiefly at $3.15@$3.50; 2,250 bbls City Mills extras, in lots, chiefly for the West Indies, at $4.90; 8,400 sacks and bbls, Spring wheat extras, at $4.35@$5.10, mainly in barrels at $4.70@$4.90, and in sacks at $4.25@$4.50, and straight extras at $4.25@$4.75, mostly in barrels at $4.60@$4.75, and clear and bakers' extras, poor to fancy, at $3.90@$4.60, mainly in barrels at $4.25@$4.50, and in sacks at $4@$4.30, and rye mixtures, chiefly in barrels, at $4.10@$4.45, bulk in barrels at $4.25@$4.40; about 5,400 sacks and bbls, Winter wheat extras, of which straights, fair ordinary to fancy, at $4.30@$4.65, mostly in barrels at $4.50@$4.60, and clears at $4@$4.50, and patent extras, ordinary to fancy, at $4.25@$4.90, chiefly in barrels at $4.60@$4.85; (No. 1 extras, in barrels, poor to choice, sold at $3.80@$4.10, as to quality, and No. 2 do at $3.15@$3.50); about 700 sacks and bbls superfine at $2.65@$3.25, and 1,650 sacks and bbls fine within the range of $2.25@$3.15, mainly Spring, in sacks, at $2.35@$2.40.——Of rye flour, 400 bbls sold in lots, including fair to strictly choice superfine, at $4.15@$4.65, chiefly at $4.40@$4.60 on a very tame market.——And of Cornmeal, 600 bbls sold, of which Brandywine at $3.10 and choice to fancy yellow Western at $3@$3.10.——Feed in demand and firm, with 40 to 80 ℔ at 90@97½c, selling chiefly at 95c.——Buckwheat flour yet held at $1.50 for choice, but in neglect.——Buckwheat dull and heavy, ranging, in all forms, track to free on board, afloat, at from 55@57c.——Rye was again in light sale and depressed in price, ranging, in all forms, at from 92@97c (about 2,500 bushels No. 1, in elevator, went at 93c).

WHEAT—Again gave way on the speculative list here (through various fluctuations) for the day about ½@¾c, on a moderately active and quite fitful business, the generally disturbing crop and weather telegrams, weaker market cables, reports of financial trouble on the Continent, and unusually extensive addition to the aggregate afloat for Europe contributing to the depression, though the extreme close was steadier, partly on covering operations, with the May delivery after regular hours quoted up ¼@½c from the lower figures of the day.——Sales were reported here of 227,000 bushels, to arrive and here within the range of 74½c@$1.01¾.——No. 2 red wheat, prompt and near by, afloat, sold to shippers at equal by the regular close to $1.01¾ and ungraded Spring and red wheat at 74½c@$1.01¾, mostly at 97½c@$1.01¾ (choice red, delivered, within the range of $1.01¾@$1.02½, and Chicago red, called No. 3, basis of 97½); No. 1 hard Spring, free on board from store, early April, at equal to about $1.01¾ (24,000 bushels) and No. 2 regular Manitoba, delivered, late March, 16,000 bushels, at 74½c; No. 1 Northern Spring, to 99½c (or 3c over the May price).

CORN—Continued urgency in the offerings, weaker cables, heaviness at the West, and hesitancy in the export movement contributed to depress prices, which again yielded, for the day, on forward deliveries, about ½@¾c on a fair speculative business, leaving off easy.——No. 2 corn, for March, closed here at 46½c (range 46½@47½c), April at 47½c (range 47¼@47½c), May at 46½c (range 46¼@47½c, against 47½c last evening), June at 46c (range 45¾@46¼c), and July at 46¼c (range 46@46½c.)

OATS—Declined for the day about ½@¾c, on freer offerings, leading to increased activity, especially in No. 2 oats, prompt and for May delivery, closing, however, rather more steadily.——No. 2 white oats, in elevator, sold at 37c, do, March, closed at 36½c; do, April, at 36½c; No. 3 white oats, in elevator, at 36@36¼; No. 2 oats, in store and elevator, at 35@35½c, chiefly at 35c, and delivered at 35@35½c, mostly at 35c; No. 2 oats, for March, closed at 34½c; do, April, at 35¼c (range 35@35½c); May at 34½c (34½@35¼c); do, June, at 34½c; do, July, at 34c; No. 3 oats at 34½c; ungraded white at 36@41c, as to quality and condition, and ungraded mixed at 34@36½c.

HOPS—Were in very limited request, and quoted barely steady, with State, new crop, fair to strictly choice, at 20@24c, and Pacific same range.——At the Exchange sales were reported of 100 bales State, medium, for July at 24½@25c.

PROVISIONS.—Hog products were in more request and somewhat stronger in price.——Pork was in fair demand, with mess at $9.75@$10.50 (family mess at $11.75@$12.50), city extra prime at $11.50, and other kinds as before quoted.——Dressed hogs were moderately sought after, with city at 6½@7c, as to weight (pigs at 6¾@7c.)——Cutmeats were held firmly and wanted, with pickled bellies, in bulk, at 6½c; pickled hams at 9@9¼c, do, shoulders at 5@5½c, and other kinds as before quoted.——Western steam lard was in fair request for early delivery, closing at $6.57½@6.60.——Refined lard here, for the Continent, quoted at $6.80@6.95, and for South America at $7.70.——Beef was in more demand, but somewhat irregular, with sales reported of 600 bbls, including extra mess at $8.50, quoted at $8@$8.50, and family mess at $11.50, quoted at $11@$11.50, and other kinds as before.——Beef hams unchanged, but quiet.——Butter and cheese without notable activity, yet quoted as before.——Eggs were lower and only moderately active, with best domestic fresh quoted at 13½@14c.——Western oil-cake, in bags, $30 tons sold at $24@$24.25.——Cottonseed oil sales reported of 300 bbls prime crude at 24½c; 700 bbls prime to strictly prime yellow at 28½@29c, and 75 bbls yellow, off grade, at 28c, showing an easier market, otherwise ruling tame.

TOBACCO.—A fair movement was reported here, but at somewhat irregular prices. Week's exports hence to Europe, 573 hhds. Sales embraced 400 hhds Kentucky leaf within the range of 5@13c; 200 cases 1890 State Havana seed leaf at 13½@30c; 50 cases 1890 New England Havana seed leaf at 35@55c; 1,000 cases 1890 Pennsylvania seed leaf at 12@15c; 240 cases 1890 Pennsylvania Havana at 12½@40c; 550 cases 1890 Wisconsin Havana at 12@14c; 150 cases sundries at 5½@35c; 850 bales Havana at 70c@$1.15, and 350 bales Sumatra at $2.25@$3.25.

WOOL.—Was in more favor and held steadily in the local market. Sales embraced 89,000 ℔ Ohio fleece, XX and above, at 28@29c; 27,000 ℔ domestic fleece, and 10,000 ℔ do, unwashed, on private terms; 55,000 in Texas at 16@30c; 30,000 ℔ do, scoured, at 40@55; 13,000 ℔ Oregon at 18½c; 12,000 ℔ unmerchantable and 508,000 ℔ foreign wool, in lots, on private terms, and 10,000 ℔ noils, also on private terms.

WOOL.

BOSTON, March 14.—There has been quite an active demand for wool during the past week, and large sales of both domestic and foreign were made. Outside of a slight decline in prices of delaines and X fleeces there is no material change to report in current values. The market is well supplied with wool for this season of the year, and the stocks in the interior are well cleaned up. There is always at this season more or less pressure to sell, and a large amount of wool is passing into consumption, and the stocks of desirable selections are not excessive. There are plenty of undesirable, faulty, burry, and delained wools, and sales in some cases are made at very low figures. There seems to be more of a disposition on the part of the manufacturer to purchase, and there is not so much quibbling over prices. Wool is unquestionably cheap, and manufacturers are willing to take at current figures when the condition and staple are right. There is no desire on their part to purchase ahead. There is no need of their doing this when they can get wool at the low prices now being quoted.

Shearing has commenced in Arizona, and samples have been received here. Owners want 14c, but it is thought that no sales will be made over 12c per ℔.

Australian wools are very active, and the largest spot sale of 300,000 ℔ of Port Phillip is reported this week. Prices in the grease range from 32½@41c, with most sales at 34@36c per ℔. A large proportion of the sales are of Port Phillip combing, fit for 70s, at 74@75c clean. New Zealand clothing, fit for 60s, sells at 31½c, or at 64c clean. Fine cross-breds are not very active, and the best fine lots sell at 65c clean. Burry and inferior lots have sold as low as 61c, but for good clothing wools 65c is as low as anything can be bought. Carpet wools are having a fair demand. China wools have the most demand, and there is some inquiry for white Bokhara at 18@18½c. Donskois are quiet.

Quotations follow:

Ohio and Pennsylvania Fleeces—No. 1 fleece, 34@35c; X and above, 27@28c; XX and above, 28@29c.

Michigan, Wisconsin, etc.—Michigan X 26c; Michigan No. 1, 33@34c; New York, New Hampshire, and Vermont X, 25@25½c; New York and New Hampshire No. 1, 32c.

Combing—Kentucky ¼-blood, 27@28c; Kentucky ½-blood, 25@26c; Indiana and Missouri ¼-blood, 24@25c; Indiana and Missouri ½-blood, 26c; No. 1 Ohio, 37@38c; No. 2 Ohio, 34@35c; No. 1 Michigan, 36@37c; No. 2 Michigan, 33@34c.

Delaine Wools—Ohio, 32@33c; Michigan fine, 31c.

Territory Wools—Montana fine, 15@17c; Montana fine medium, 18@20c; Montana No. 2 medium, 21@23c; Wyoming, Utah, and Colorado fine, 13@15c; Wyoming, Utah, and Colorado fine medium, 18@19c; Wyoming, Utah, and Colorado No. 2 medium, 20@22c.

Southern Clothing Wools—Georgia, 24@25c; Kentucky, ¼-blood clothing, 24@25c; Kentucky, ½-blood clothing, 26@28c.

Texas and Southern Wools—Texas Spring medium (12 months), 20@21c; Texas Spring fine, 18@19c; Texas Spring fine (6 to 8 months), 17@19c; Texas Spring medium (6 to 8 months), 19@21c; Texas Fall, 15@20c.

Kansas and Nebraska Wools—Fine, 14@15c; medium, 20@21c; carpet, 13@14c.

Unwashed and Unmerchantable Wools—Michigan and Ohio fine unwashed, 18@20c; Ohio and Pennsylvania unmerchantable, 23@24c; Michigan unmerchantable, 20@21c.

California Wools—Spring Northern, 21@22c; middle County Spring, 17@19c; Southern defective, 14@17; free Northern Fall, 17@19c; Southern do, 12@13; defective, 9@11c.

Oregon Wools—Eastern, fair, 16@17c; choice, 18@19c; valley, 21@25c.

Montevideo wools nominal; fair to choice, 27@29c.

Cape Wools, 26@28½c, as to quality.

Carpet Wools—Aleppo, 14c; Angora, 14@14½c; Assyrian, 13@13½c; Cordova, 16½c; Donskoi Autumns, 19c; combings, 26@27c; carding, nominal, 22@24c; yellow, nominal, 21@23c; gray, nominal, 16@17c; black, nominal, 15@16c; greasy, 12½@13½c; East India Vicanere, nominal, 31@32c; Candahar, nominal, 28@30c; Joria, nominal, 31@33c; Bagdad, white, nominal, 26c; do, colored, nominal, 21@23c.

A Dude's Question.

Chumpley—I say, Chollie, doncherknow, I just received an anonymous letter, doncherknow.

Lapley—Good gwacious! Who from?—*Harvard Lampoon.*

A Thoughtful Parent.

The Groom—I can't see that check your father placed among the wedding presents.

The Bride—Papa is *so* absent-minded. He lit his cigar with it.—*Life.*

Not Much Character Left.

The late Sir Thomas Chambers was not a wit, and laughter seldom entered the court over which he presided so solemnly. There is, however, one good story told of him in the Temple. It is to the effect that a prisoner, who was undefended, pleaded "guilty," and counsel having been instructed to defend him at the last moment, withdrew the plea and substituted that of "not guilty," with the result that the jury acquitted him. In discharging the prisoner, Sir Thomas is said to have remarked:

"Prisoner, I do not envy you your feelings. On your own confession you are a thief, and the jury have found that your are a liar."—*London Star.*

Not an Objection.

Minnie—Even though it was my last chance I would never marry a man who was devoted to a fad.

Mamie—No? Yet that is just what I expect to do shortly.

Minnie—And what is his particular fad, please?

Mamie—Me.—*Germantown Farmer.*

Large Idea.

Only Child—Oh, mother, how I wish I could be born again.

Mother—What on earth makes you say that, dear?

Only Child—Oh, then, I should be twins and have someone to play with!

A FANCY CUFF BUTTON.

This button is heavy rolled gold, richly chased. In the center is a beautiful diamond-cut brilliant. It is one of the finest buttons of the season. We send a pair of these buttons for a club of only two subscribers, at $1 each. For sale at 90 cents.

TWO GOOD PAPERS,

THE AMERICAN FARMER

AND

THE NATIONAL TRIBUNE,

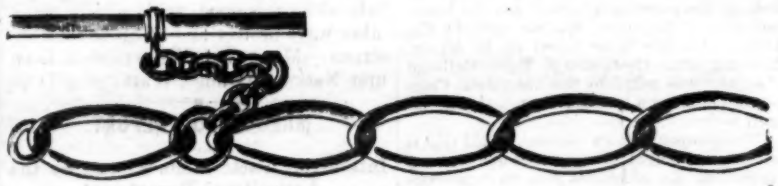
FOR $1.50 A YEAR.

We have arrangements for clubbing with THE NATIONAL TRIBUNE, of Washington, D. C., by which we can furnish the two papers at a reduced price. THE NATIONAL TRIBUNE is the leading soldier and family paper in the country. It has 12 large pages, seven columns to the page, filled with the best literary and historical matter, well illustrated. Leading writers contribute to it, and it has a very large circulation. Its average circulation last year was more than 130,000 copies a week. The subscription price is $1 a year. The subscription price of THE AMERICAN FARMER is also $1 a year. We will furnish the two papers for one year for $1.50. This makes more good reading matter for a small amount than can be gotten anywhere else. Send for a sample copy of THE NATIONAL TRIBUNE.

Address all communications to

THE AMERICAN FARMER,
1729 New York Avenue, Washington, D. C.

HEAVY GOLD-PLATED CHAINS.



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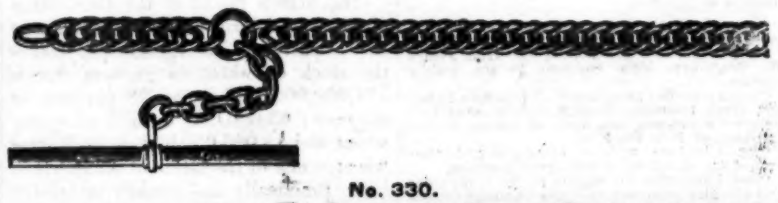

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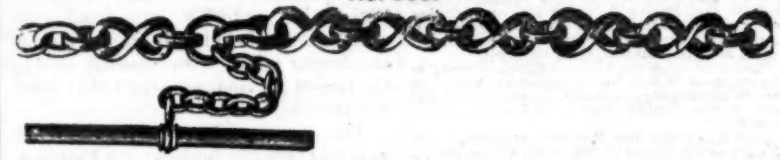

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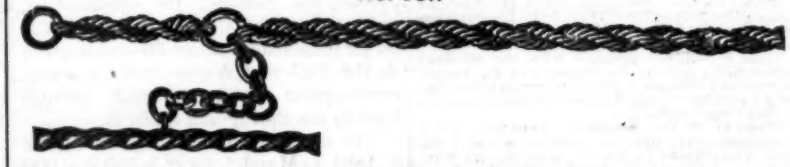

No. 332.

The above chains are made of solid-rolled gold plate. They are guaranteed to wear ten years, and the designs are the latest and best in the market. The cuts exactly represent the style of the links, showing the handsome bar, swivel and extra links to which charm may be attached.

No. 329 is a heavy trace chain. Sent for a club of 5 subscribers at $1 each and $1.25 added money. Sent free as a Premium for a club of 10 subscribers at $1 each. For sale for..... $3 15

No. 330 is a curb chain. Sent for a club of 4 subscribers at $1 each and $1.25 added money. Sent free for a club of 9 subscribers at $1 each. For sale for..... $2 75

No. 331 is a new style chain. Sent for a club of 4 subscribers at $1 each and $1.10 added money. Sent free for a club of 8 subscribers at $1 each. For sale for..... $2 50

No. 332 is a heavy rope chain. Sent on same terms as No. 329.

The safe delivery of all these chains is guaranteed. Address

THE AMERICAN FARMER CO., Washington, D. C.

GOLD BAND

DECORATED TABLE SERVICE

AT CUT PRICES.

Read Below the Four Selections to Suit Various Tastes and Needs.

We have secured for the benefit of our subscribers a splendid set of Decorated China with gold band around the edge of the pieces. It is made especially for us at the largest and best pottery in the United States. We buy in very large quantities, and thus we are able to supply this elegant ware as described below. We are able now to make a grand combination of four different sets to choose from.

Our China is highly ornamental, being decorated in three colors, with a design of fruits and flowers, in addition to which there is a gold band about the edge, as shown in the cut, which is made from a photograph of a set of the China we offer.

In order to save space, all the pieces are shown in one picture. The reader can readily tell which are referred to. The same plates, teapot, sugar-bowl, etc., go with all the sets, but in the larger offers more and more pieces are added to the tea set. All are of the same beautiful style of decoration.

First is

A 56-PIECE TEA SET.

It consists of 12 plates, tea size; 12 fruit saucers, teapot and cover, sugar-bowl and cover, a creamer, one bowl, one dozen tea cups and saucers to match, one bread plate, and one cake plate.

DINNER AND TEA SET COMBINED, 84 PIECES.

This beautiful set comprises 12 breakfast plates, 12 tea plates, 12 cups, 12 saucers, 12 fruit saucers, 12 individual butter plates, two cake plates, one teapot and cover, one sugar-bowl and cover, one creamer, one slop bowl, one large meat platter, one large and stylish gravy-boat, and one large vegetable dish and cover, in all **84 Pieces,** making a complete dinner or tea set for any table.

EXTRA DINNER AND TEA SET COMBINED, 100 PIECES.

This set is the same as the 84-piece set, with the addition of the following beautiful and useful articles, viz: 12 pie plates, one pickle-dish, one water-pitcher, and two bakers, or uncovered vegetable dishes, in all 100 pieces.

GRAND EXTRA DINNER AND TEA SET COMBINED, 125 PIECES.

This the same as the 100-piece set described above, with the addition of the great turkey platter and one dozen after-dinner coffee cups and saucers to match.

This makes the grandest China premium ever offered entire by us or any other publisher, and at a price below that possible to anyone else.

HOW TO SECURE IT.

First, the Tea Set. We will send this beautiful 56-piece tea set, by express or freight, for $6.25, or for a club of 10 yearly subscribers and $2 additional; or we will give it free for a club of 20 yearly subscribers at $1 each.

The 84-piece dinner and tea set combined will be sent to any address in the United States as a Premium for a Club of only 10 subscribers for one year and $3 additional, or for a Club of only 20 subscribers for one year and $1.50 in money additional; or we will sell it outright for $8.10. We prefer the Club.

The 100-piece extra dinner and tea set combined will be sent to any address in the United States as a Premium for a Club of 10 yearly subscribers at $1 each and $5.75 added; or for a Club of 20 yearly subscribers and $3 added; or *free* as a Premium for a Club of 33 yearly subscribers. For sale at $10.35.

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Bard—Is the poetry editor in? I left some poems here——

Boy—The editor is out.

Bard—Out?

Boy—Yes; out of his head. He's been reading your poems.

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"Got a pain in the bridge of your nose, eh? Well, you ought to get over that easily."

"How?"

"That's what bridges are for, ain't they—to get over things?"

How He Felt About It.

Bookkeeper—I would like to have this afternoon off, if you please.

Senior Partner—What is the matter, Mr. Penn?

Bookkeeper—I wish to attend my wife's funeral. I feel that it is something I ought to attend to personally.—*Epoch.*

The proper thing for a jury is to be firm, but not fixed.—*Washington Star.*

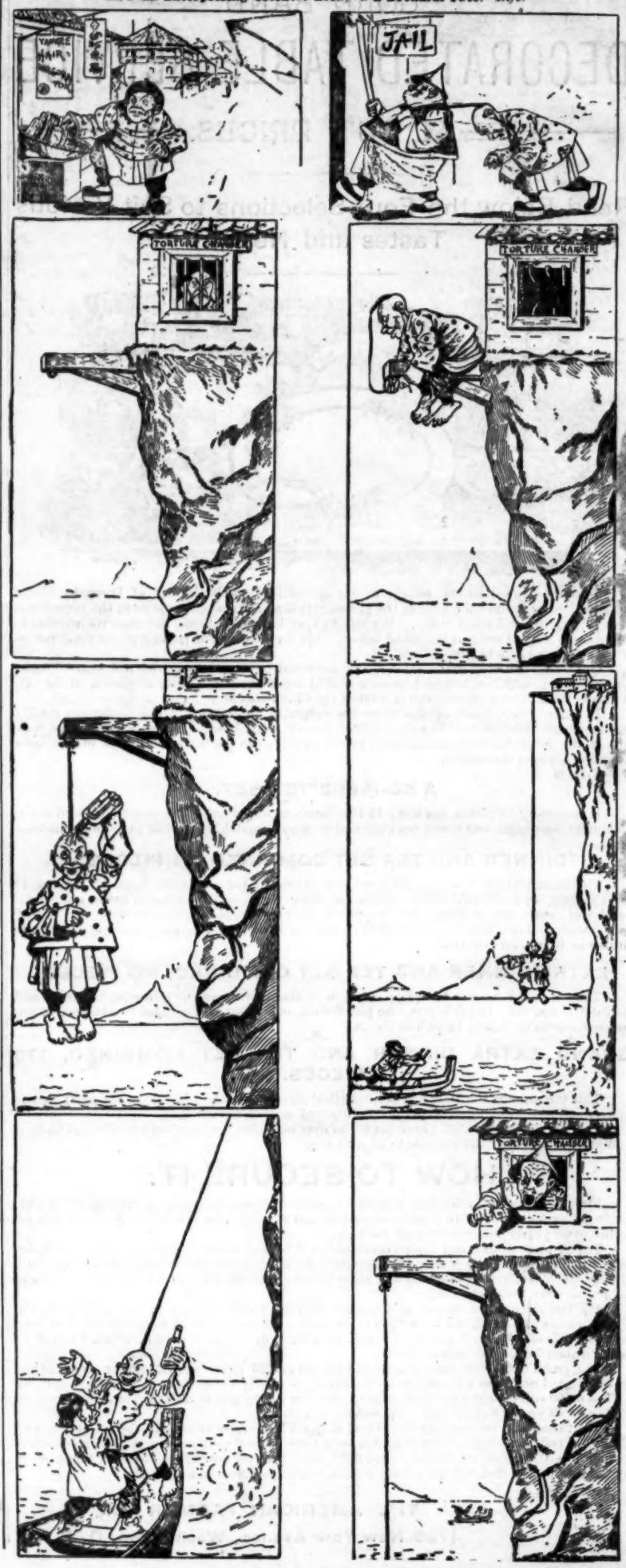
Nil Desperandum.

He—Upon my word, I think I have gone through every experience, except hanging.

She—Cheer up, dear; that may come yet.

Men who declare the world owes them a living are usually too lazy to hustle around and collect it.

How an Enterprising Oriental Escaped a Dreadful Fate.—*Life.*



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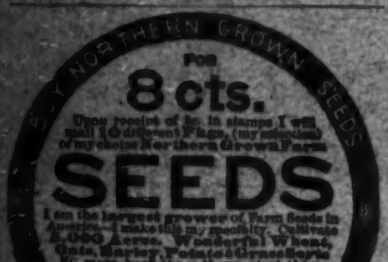

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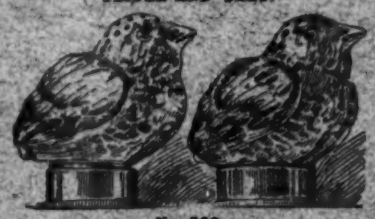

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